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THE *Gentleman's Diary*,

OR THE

MATHEMATICAL REPOSITORY;

An ALMANACK

For the YEAR of our LORD 1760.

BEING

BISSEXTILE, or LEAP-YEAR.

Containing many useful and entertaining Particulars peculiarly adapted to the ingenious Gentlemen engaged in the delightful Study and Practice of the

MATHEMATICKS.

The Twentieth *Almanack* published of this Kind; and the Eighth of the NEW STYLE in *England*.

——— Quâ causâ argentea Phœbe
Passibus haud æquis graditur; cur subdita nulli
Hactenus Astronomo numerorum fræna recusat:
Cur remeant Nodi, curque Auges progrediuntur.
——— Quantis resluum vaga Cynthia pontum
Viribus impellit; dum fractis fluctibus ulvam
Deserit, ac Nautis suspectas nudat arenas,
Alternis vicibus suprema ad littora pulsans.

LONDON,
Printed for the Company of STATIONERS.
MDCCLX.
[Price Nine-pence stitch'd]

k.
J. Johnson's Ex.

PROPOSED to be engraved by *Subscription*, A Copper Plate Print (26 Inches by 21) of a new and curious Work, intituled,

THE GEOGRAPHY OF THE GREAT SOLAR ECLIPSE of the *Penumbra* over the Earth, on *Sunday April* 1, 1764.

CONTAINING,

A PROJECTION of that Part of the Earth's *Surface*, to whose Inhabitants the Eclipse will be visible; upon which Curves are drawn, shewing the *Beginning*, *Middle*, and *End* of the ECLIPSE, at Sun Rising and Setting: The *Path* of the *Central* Shadow; the *Penumbra's* Expansion; and the Digits eclipsed at any *Place*. Also are shewn the Digits eclipsed at Sun *Rising* and *Setting*, at those Places where the *greatest* Obscuration happens before Sun *Rising*, and after Sun *Setting*. But, what is still more curious, the Time of the *Middle* of the ECLIPSE, as well as the Quantity of the *greatest* OBSCURATION, may be known by this PROJECTION to the utmost TRUTH, by little more than *bare Inspection*; which will be illustrated by an EXAMPLE. Besides which, this WORK will be further illustrated with TYPES for the most remarkable Places.

By JOHN TODD Excise-Officer, at *Tythby*, in *Nottinghamshire*.

(Price Two Shillings, plain.)

THOSE who are pleased to encourage this WORK, are desired to send their Names to the AUTHOR, at *Tythby*, where the Original may be seen: Or, to THOMAS PEAT, Writing-Master, Accomptant, and Surveyor, in *Nottingham*, by whom the *Prints* will be delivered to SUBSCRIBERS.

WE can assure the *Publick*, that this Work has been seen by several FELLOWS of the ROYAL SOCIETY, and other eminent MATHEMATICIANS, who all allow it to be a very curious and complete Piece of ASTRONOMY.

To the PUBLICK.

ALL Persons who are pleased to be *Contributors* to this DIARY, by answering the *Questions*, *Ænigmas*, &c. or by sending in new ones, or other *Subjects* proper for the WORK, are desired to send *them* and their *Solutions* along with them, before the first Day of *May* 1759, directed for the Authors of the GENTLEMAN'S DIARY; to be left with THO. PEAT, School-master in *Cartergate*, NOTTINGHAM; and no where else (post paid, or they will not be received.

JANUARY hath xxxi Days.

Full Moon the 2d
Last Quarter the 10th
New Moon the 18th
First Quarter the 25th
} Day at {
2 min. past 5 Afternoon
42 min. past 3 Morn.
31 min. past 6 Morn.
40 min. past 7 Morn.

M	☉ Decl. South.
1	23° 3′
6	22 33
11	21 52
16	21 00
21	19 58
26	18 47

			6M 40	11A 16
1	Tu	Circumcision. New Year's Day.		
2	W	*Expect* Weather *to be this Year, nearly*	☽ Rises	Morn.
3	Th	*such, or such like, as in some former Years.*	4 A 47	17
4	F	Days increased about a Quart. of H.	5 59	1 17
5	S	Old Cristmas-Day.	7 15	2 12
6	F	Epiphany, Christ's * app. to Gen	8 32	3 8
7	M	(*Salisbury*, Wiltshire the 6th)	9 41	3 49
8	Tu	Lucian, Priest & M.	10 50	4 33
9	W	*Canterbury.*	11 59	5 15
10	Th		Morn	5 56
11	F	Days increased 26 minutes.	1 6	6 36
12	S	Old New-Years Day.	2 12	7 17
13	F	1 Sunday after Epiphany.	3 19	8 0
14	M	(*Preston*, Lanc. the 13th)	4 27	8 46
15	Tu	*Barston*, Yorkshire.	5 35	9 35
16	W	*Hickford*, Lanc. Day 8 hours 20 m. l.	6 38	10 27
17	Th	*Tavistock*, Devonshire.	7 33	11 20
18	F	Prisca, Rom. V. & M. *Nottingham.*	☽ Sets	0A 14
19	S	In eight Days of St. Hillary. (20)	5A 27	1 8
20	F	2 Sunday after Epiphany.	6 47	2 0
21	M	Agnes, Rom. V. & M. *Bristol.*	8 6	2 50
22	Tu	Pint. Span. Deac. M.	9 25	3 40
23	W	Term begins.	10 46	4 29
24	Th	Ch. Fred. K. of *Prussia* born 1712	Morn.	5 18
25	F	Conv. of St. Paul.	7	6 8
26	S	From the Day in St. Hil. on 15 D. (27)	1 29	7 0
27	F	3 Sunday after Epiphany.	2 51	7 55
28	M	Days increas'd an hour and 10 min.	4 12	8 54
29	Tu	*Grampound*, Cornwall.	5 27	9 54
30	W	K. Charles Mart. at *Whitehall.*	6 30	10 53
31	Th	12 min. past 1, 1649.	7 19	11 48

D	☉ Rises	☉ Sets	☽ Sets	♄ Sets	♂ Rises	♀ Rises	☿ Sets	Cl. bef. ☉
1	8h 4′	3h 56′	9A 23	5 A 28	10A 21	4M 0	4 A 36	4′ 1′
6	8 1	3 59	9 4	5 13	10 5	4 4	Rises	6 18
11	7 56	4 4	8 45	4 58	9 49	4 9	6 M 39	8 25
16	7 50	4 10	8 26	4 43	9 33	4 15	6 17	10 17
21	7 44	4 16	8 8	Rises	9 15	4 21	6 10	11 50
26	7 36	4 24	7 50	7 M 38	8 54	4 29	6 11	13 5

FEBRUARY hath xxix Days.

M D	☉ Decl. South.
1	17° 11
6	15 42
11	14 6
16	12 25
21	10 39
26	8 40

Full Moon the 1st, Last Quarter the 9th, New Moon the 16th, First Quarter the 23d. } Day at { 32 min. past 6 Morn. / 18 min. past 3 Morn. / half past 8 at Night. / 26 min. past 6 Afternoon

M D	W D	Sundays, Holy and Remarkable Days, Length. iner. Days Terms, Fairs, &c.	☽ Rises & Sets.	Moon South.
1	F	Day 9 hours 8 min. long. (*Fast.*	4 A 42	Morn.
2	S	Purification V. M. Candlemas Day	6 0	0 42
3	F	Septuagesima Sunday. Blasius Bp.	7 13	1 32
4	M	On the Mor. of the Purif. B.V.M. (3)	8 25	2 18
5	Tu	**Agatha** Sicil V. & M. *Gravesend*, K.	9 35	3 1
6	W	Days are now increased, and the	10 43	3 42
7	Th	Nights shortened 1 Hour & 46 min.	11 50	4 23
8	F	*Bingham*, in the Vale of *Belvoir*, Not.	Morn.	5 6
9	S	In eight Days of the Purif. B. V. M.	0 58	5 48
10	F	Sexagesima Sunday.	5 6	6 32
11	M	*Llanduffel*, Monm.	13 7	7 20
12	Tu	Term ends.	4 20	8 10
13	W	Old Candlemas-Day. *Dorchester.*	5 18	9 3
14	Th	**Valentine**, Bish. and M. *Flint.*	6 9	9 58
15	F	Days begin to lengthen a pace,	6 56	0 53
16	S	getting 4 minutes every Day.	☽ Sets	1 47
17	F	Quinquagesima, or Shrove Sunday	5 A 44	0 A 40
18	M	*Nun-Eaton*, Warwickshire.	7 6	1 32
19	Tu	**Shrove Tuesday.**	8 20	2 23
20	W	Ash-Wednesday, 1st Day of Lent.	9 53	3 13
21	Th	Day 10 hours 22 min. long.	11 17	4 4
22	F	*Beverly*, Yorkshire. Fretum.	Morn.	4 57
23	S	*Godalming*, Surrey. (*Fast.*	0 39	5 50
24	F	1 Sun. in Lent. St. Mat. Ap. and M.	2 0	6 47
25	M	*Feversham*, Kent. *Llanfechel*, Angleses	3 18	7 46
26	Tu	*Oundle*, Northamptonshire.	4 24	8 44
27	W	Ember Week.	5 17	9 41
28	Th	*Chesterfield*, Derbyshire.	5 57	10 36
29	F	Days increased 3 hours 8 min.	6 25	11 26

M D	☉ Rises	☉ Sets	☽ Sets	♄ Rises	♂ Rises	♀ Rises	♃ Rises	Cl. fast.
1	7h 26	4 34	7 A 29	7 M 17	8 A 29	4 M 37	6 M 17	14' 8"
6	7 18	4 43	7 12	7 0	8 6	4 43	6 23	14 38
11	7 9	4 52	6 55	6 43	7 47	4 48	6 27	14 46
16	7 2	4 59	6 39	6 27	7 32	4 53	6 30	14 38
21	6 50	5 11	6 24	6 10	6 48	4 57	6 32	14 9
26	6 41	5 20	6 8	5 53	6 20	4 59	6 30	13 25

MARCH hath xxxi Days.

				M D	☉ Decl. South
Full Moon	the 1st	20 min. after 9 at Night.		1	7° 18
Last Quarter	the 9th	59 min. past 11 at Night.		6	5 23
New Moon	the 17th	Day at 53 min. after 7 Morn.		11	3 25
First Quarter	the 25d	40 min. past 11 at Night.		16	1 27
Full Moon	the 31st	7 min. past 1 Afternoon.		21	0 N 32
				26	2 29

1	S	David Arch. B. M.	6 M 52	Morn.	
2	E	Reminiſcere, 2 Sunday in Lent.	☽ Riſes	0	12
3	M	Days are now 11 hrs and 4 min. long	7 A 20	0	57
4	Tu	*Melton Mowbray*, Leiceſterſhire.	8 30	1	40
5	W	*Blandford*, Dorſetſh. *Caerwye*, Flintſh	9 39	2	21
6	Th	*Bourn*, Linc. *Whitland*, Glouceſtſh.	10 48	3	4
7	F	Perpetua Maurit. M. *Nottingham.*	11 55	3	46
8	S	Cyprian.	Morn.	4	30
9	E	Oculi, 3 Sunday in Lent.	1 3	5	16
10	M	Days are now encreaſed and Nights	2 10	6	5
11	Tu	decreaſed 3 hours and 52 min.	3 11	6	57
12	W	Greg. M. B. of R & C.	4 5	7	49
13	Th	and are encreaſing daily.	4 50	8	44
14	F	*Noathop*, Flintſh. *Sevenoak*, Kent.	5 25	9	39
15	S	*Oakham*, Rutl. *Oſweſtry*, Shropſh.	5 53	10	32
16	E	Midlent Sunday. [Wilts.	6 17	11	25
17	M	*Hariff*, Huntingdonſh. *Malmeſbury*,	☽ Sets	0 A	17
18	Tu	Ed. R. of Weſt. Sax. *Worksop*, Not.	7 A 36	1	9
19	W	☉ ent. ♈ 15 h. 11 min. appar. Time.	9 3	2	1
20	Th	*Durham.* Equal Day and Night.	10 30	2	55
21	F	Benedict. Abb. of *Downes*, Devonſh.	11 56	3	51
22	S	Day 12 hours and 20 min. long.	Morn.	4	50
23	E	Judica, 5 Sunday in Lent. [Faſt.	1 17	5	49
24	M	*Llanerchemith*, Caerm. *Shirley*, St. W.	2 27	6	48
25	Tu	Annunci. L. Day. Pr. Edward b.	3 24	7	45
26	W	*St. Albans*, Hertf. *Glouceſter. Nampton*	4 8	8	39
27	Th	Ch. *Atherſtone*, Warw. *Preſt.* Lanc.	4 40	9	30
28	F	*Cobham*, Surrey. *Patrington*, Yorkſh.	5 7	10	17
29	S	*Stourbridge*, Worceſt.	5 26	11	2
30	E	Palm Sunday	5 43	11	45
31	M	*Durham*, laſts 3 Days (Luke Elſtob.)	☽ Riſes	Morn.	

M D	☉ Riſes	☉ Sets	♄ Sets	♃ Riſes	♂ Riſes	♀ Sets	☿ Riſes	Cl. bef. ☉
1	6h 33'	5h 28	5 A 56	5 M 4	5 A 56	4 M 59	6 M 28	12' 41'
6	6 23	5 38	5 21	5 25	5 28	4 59	6 25	11 32
11	6 13	5 48	Riſes	5 9	Sets	4 57	Sets	10 12
16	6 3	5 58	6 M 4	4 53	6 M 17	4 53	6 A 16	9 46
21	5 53	6 8	5 47	4 37	5 56	4 49	6 58	7 15
26	5 43	6 18	5 30	4 22	5 35	4 44	7 38	5 40

APRIL hath xxx Days.

				M D	☉ Decl. North.
				1	4° 49
Last Quarter	the 8th	10 min. bef.	6 Aftern.	6	6 44
New Moon	the 15th	10 min. past	5 Aftern.	11	8 35
First Quarter	the 22d	10 min. bef.	9 Morn.	16	10 23
Full Moon	the 30th	28 min. aft.	5 Morn.	21	12 06
				26	13 45

1	Tu	All Fools-Day, *Coventry*, Warwickſh.	7	A 34		☾ M 27
2	W	*Lutterworth*, Leiceſterſh. *Saliſb.* Wilts	8	43		1 7
3	Th	**Kitha** d B. of C. *Chicheſter*, Suſſex	9	51		1 49
4	F	Good Friday. **St. Ambr.** B. of M	11	0		2 33
5	S	Old Lady Day. *Hunt.* Montg. {*Faſt*	Morn.			3 19
6	E	EASTER-DAY. Our SAVIOUR's Re	0	8		4 7
7	M	Eaſter Monday, *Atherſtone*, Warwick.	1	11		4 57
8	Tu	Eaſter Tueſday, *Selby* Y. Ch. Meſban.	2	6		5 48
9	W	Days encreaſed 5 hours and 46 min.	3	53		6 42
10	Th	and are now 13 h and 34 m. long.	3	31		7 34
11	F	*Newport-Pagnel*, Bucks.	4	2		8 26
12	S	*Haltwhiſtle*, Northumb.	4	26		9 17
13	E	Low Sunday. 1 Sund. after Eaſter.	4	48		10 10
14	M	Days are now 13 h. 50 min. long.	5	7		11 2
15	Tu	*Bewley*, Hampſhire. {Dorſet.	☽ Sets			11 54
16	W	*Dilton's-Marſh*, Wilts. *Piddle-Town*,	8	A 9		☾ A 49
17	Th	*Malmſbury*, Wilts.	9	40		1 45
18	F	*Cobham*, Surrey. *Derby.*	11	8		2 45
19	S	**Alphage** Archb. Cant.	Morn.			3 45
20	E	2 Sunday after Eaſter.	0	25		4 48
21	M	From the D. of Eaſt. in 15 Days (20)	1	29		5 48
22	Tu	*Giſborough*, Yorkſh. *Shrewſb.* Shropſh.	2	18		6 44
23	W	**S. George** Martyr.	2	54		7 35
24	Th	*Aberforth*, Yorkſh. *Linc. Harb.* Norf.	3	21		8 23
25	F	St. Mark Ev. & M. *Buckingham.*	3	41		9 8
26	S	Prince WILLIAM born.	3	59		9 51
27	E	3 Sunday after Eaſt.	4	14		10 32
28	M	From the Day of Eaſter in 3 W. (27)	4	28		11 14
29	Tu	*Market-Harbro'*, Leiceſt. *Newchurch*,	4	44		11 55
30	W	Lanc. *Giſborough*, Yorkſhire.	☽ Riſes	Morn.		

M	D	☉ Riſes	☉ Sets	☽ Riſe	♃ Riſes	♂ Sets	☿ Riſes	♀ Sets	Clock ☉
	1	5h 31	6h 30	5 M 9	4 M 3	5 M 8	4 M 3	8 A 19	3′ 40″
	6	5 21	6 40	4 52	3 46	4 47	4 32	8 41	2 19
	11	5 12	6 49	4 34	3 29	4 26	4 24	8 47	0 54
	16	5 2	6 59	4 18	3 14	4 6	4 1	8 36	0 Aft. 9
	21	4 53	7 8	4 0	2 57	3 47	4 10	8 10	1 31
	26	4 44	7 14	3 41	2 40	3 26	4 11	7 28	2 27

MAY hath xxxi Days.

M D	☉ Decl. North.
	18
6	16 44
11	18 04
16	19 16
21	20 20
26	21 16

Last Quarter the 8th
New Moon the 15th
First Quarter the 21st
Full Moon the 29th
} Day at {
42 min. past 7 Morning.
2 min past 1 Morning.
34 min. past 7 Afternoon.
half past 9 Morning.

1	Th	St. Philip and Jac. Ap. & M.	8A	57	0	M 8
2	F	*worth*, Derb. *Lanc. Breck. Redr.* Corn.	10	4	1	W 22
3	S	Invent. of the Cross. *Westham*, Kent.	1	9	2	T 9
4	E	4 Sunday after Easter.	Morn.		2	57
5	M	From the Day of Easter in 1 Month.	0	6	3	48
6	Tu	St. John Evang. ante port Lat. *Kend.*	0	56	4	40
7	W	*Bath*, Som. *Dunmow*, Essex, *Leek*, St.	1	37	5	32
8	Th	*Philips-Norton*, Som.	2	9	6	23
9	F	*Bosworth*, Leic. *Tockingham*, Glouces.	2	30	7	14
10	S	*Fringe*, Norf. *Lutterworth*, Leic.	2	57	8	9
11	E	5 Sunday after Easter. Rogat. Sund.	3	16	8	53
12	M	Old May Day. (From the Day of E.	3	34	9	44
13	Tu	(*Barnsley* Yorksh. the 12th A. Horsf.	3	53	10	36
14	W	Rogat. Week. *Denby. Wells*, Som. (f	4	14	11	M 32
15	Th	Holy Thursday Christ's Ascension	☽ Sets		0	A 30
16	F	On the Morrow of the Ascension.	10	A 5	1	31
17	S	*Asteford*, *Holbeach*, Linc. *Wareham*, D.	11	17	2	35
18	E	Exaudi. 6 Sunday after Easter.	Morn.		3	37
19	M	**Dunstan**, Archb. C. Term Ends.	0	16	4	37
20	Tu	*Galgarth*, Breckn. *Wickham*, Hants.	0	58	5	33
21	W	*Ashborn*, Derb. *Gromslock* Devonsh.	1	28	6	23
22	Th	*Albots-Bromley*, Staff. *Greenstreet* Es.	1	50	7	9
23	F	*Dorchester*, *Bala*. Merioneth.	2	9	7	51
24	S	Pr. Fred. Wil. born. *Fast.*	2	24	8	33
25	E	Whit-Sunday. Descent of the H. G.	2	38	9	13
26	M	Whit-Monday *Rotherham*, Y. A. H	2	52	9	55
27	Tu	Whit-Tuesday, *Newark* upon Trent.	3	7	10	36
28	W	Ember Week. *Bingham*, Not.	3	24	11	20
29	Th	K. Charl. II. Birth and Ret. ☽ Ec. in	☽ Rises		Morn.	
30	F	*Derby*, *Rochester*, Kent. *Worksop* Not.	9A	1	0	W 6
31	S	Days increas'd 8 hours 32 min.	10	1	0	51

MD	☉ Rises	☉ Sets	☽ Rises	♃ Rises	♂ Rises	♀ Sets	☿ Set.	Cl. att.	☉ M
1	4h 35'	7h 26'	3 M 24	2 M 23	3 M 7	3 M 52	4 M 25	3 12	
6	4 27	7 34	3 5	2 4	2 49	3 44	4 10	44	
11	4 19	7 42	2 47	1 46	2 30	3 35	3 56	0 0	
16	4 11	7 50	2 28	1 28	2 11	3 26	3 42	4 2	
21	4 4	7 57	2 9	1 10	1 53	3 18	3 30	3 0	
26	3 58	8 3	1 50	0 51	1 35	3 10	3 18	2 4	

JUNE hath xxx Days.

M D	☉ Dec North.
1	22° 10′
6	22 45
11	23 10
16	23 25
21	23 29
26	23 23

Last Quarter the 6th
New Moon the 13th
First Quarter the 20
Full Moon the 28th
Day at 32 min. past 5 Afternoon.
18 min. past 8 morn.
11 min. past 8 Morn.
23 min. past Noon.
☉ enters ♋ 20 D. 14 ho. 8 m. apparent Time.

1	E	Trinity Sunday.	10A	54	1 M 44
2	M	On the Morrow of the Holy Trinity	11	37	2 3
3	Tu	*Harsley Green*, Lanc. *Kerby Steph.* W	Morn.		3 21
4	W	Prince of W. b. *Newark*, on Trent.	0	12	4 1
5	Th	Bonif. B. of Mentz, M.	0	38	5 7
6	F	Term begins. *Folkingham*, Linc.	1	0	5 56
7	S	*Montgomery*, *Stow in Guillam*, Suff.	1	20	6 43
8	E	1 Sunday after Trinity.	1	36	7 30
9	M	In 8 Days of the Holy Trinity (8.)	1	53	8 20
10	Tu	*Granbrook*, Kent, *Hounslow* Middlef.	2	12	9 11
11	W	St. Barnabas Ap. & M.	2	35	10 1
12	Th	☉ eclipsed visible. *Haverford-West.*	3	2	11 7
13	F	*Kedderminster*, Worc. *Llanerchemith*, A.	☽ Sets		0A 9
14	S	*Bangor*, Cornw.	9A	57	1 14
15	E	2 Sunday after Trinity. (15	10	47	2 17
16	M	From the D. of the H.T. in 15 Days	11	23	3 15
17	Tu	St. Alban, M. *St. Alban's* Herf.	11	50	4 9
18	W	*Darlington*, Durh. (L. E.) *Wiggan*, L.	Morn.		4 58
19	Th	*Ingleton*, Yorksh. Longest Days.	0	10	5 43
20	F	Transl. of Edw. K. of West. Sax.	0	26	6 26
21	S	Days will now begin to grow *shorter.*	0	41	7 7
22	E	3 S. after Trin. K. GEO. II. inaug.	0	55	7 48
23	M	From the D. of the H.T. 3 W. (22) *F.*	1	9	8 29
24	Tu	Nat. St. John Bap. (*Selby* Y. 23.)	1	26	9 12
25	W	Day 16 ho. and above an half long.	1	45	9 57
26	Th	K. GEORGE II. proclaimed, 1727	2	7	10 45
27	F	*Boston*, Linc. *Built*, Breck. *Burt.* Staff.	2	38	11 34
28	S	*Folkest.* St. *Pombs*, Corn. *Stow Green*, D.	☽ Rises		Morn.
29	E	4 S. after Trin. St. Peter, Ap. & M.	9A	31	0 25
30	M	*Bridgenorth*, Sh. *Thwayte-Parish*, Suff.	10	8	1 18

M D	☉ Rises	☉ Sets	☽ Rises	♃ Rises	♂ Sets	♀ Rises	☿ Rises	C. aft. ☉
1	3h 53′	8h 9′	1 M 26	0 M 27	1 M 14	1 M 1	3 M 6	2′ 39
6	3 47	8 13	1 6	0 7	0 55	2 56	2 59	1 50
11	3 45	8 15	0 46	11 A 42	0 37	2 51	2 57	0 52
16	3 44	8 16	0 26	11 21	0 19	2 47	2 59	obf. 10
21	3 42	8 17	0 5	11 1	11 A 58	2 46	3 10	1 14
26	3 44	8 16	11 A 41	10 41	11 41	2 41	3 20	2 17

JULY hath xxxi Days.

			M D	☉ Decl. North.
Last Quarter the 5th	Day at	24 min. past Midnight.	6	22 42
New Moon the 12th		7 min. before 4 Aftern.	11	22
First Quarter the 19th		15 min. past 11 at Night	16	21 19
Full the 28th		36 min. past 1 Morn.	21	20 24
			26	19 21

1	Tu	*Hith*, K. *Thorney-Abbey*, Ely *Worksop*,	10 A	38	2 M	9
2	W	Visit. of the B. V. Mary *Brecknock*	11	1	2	58
3	Th	*Dereham*, Norf. *Shrewsbury*, *Patton*, B.	11	21	3	48
4	F	*Chesterfield*, Derb. *Lancaster*, *Hogsha.*	11	37	4	35
5	S	Old Midsummer, *Beverly*, Yorkshire.	11	55	5	22
6		6 Sunday after Trinity.	Morn		6	10
7	M	Tho. a Becket. *Chipping-Norton.*	0	11	6	58
8	Tu	*Faleſtone*, Kent. *Machynleth*, Montg.	0	31	7	50
9	W	*Bromley*, Devonſh.	0	55	8	45
10	Th	*York*, Chr. Meſban. *Hithe*, S. *P.* in Th.	1	27	9	44
11	F	*Peterborough*, Northamp.	2	11	10	48
12	S	*Canterbury*, Kent. *Carpenturiton*, Surry.	) Sets		11	51
13		7 Sunday after Trinity.	9 A	12	0	55
14	M	Days are decreaſing every Day.	9	44	1	54
15	Tu	Swithin, B. of Winchester tranſlated	10	8	2	43
16	W	*Winchest. Polſtead*, Sur. *Woodhurſt*, Bon.	10	26	3	31
17	Th	*Belt*, Breck. *Leek*, [illegible] *Lambithe*, D.	10	42	4	10
18	F	*Denbigh. Penryn*, Corn. *Harrington*, L.	10	56	4	50
19	S	*Kenninghall*, Norfolk.	11	12	5	24
20		8 Sunday after Trinity.	11	27	6	02
21	M	*Alberwin-Green*, Thamesh. *Swaffh.* N.	11	45	7	15
22	Tu	St. Mary Magdalene. *Colchester*, Eſſ.	Morn.		7	45
23	W	*Daventry*, North. *Aldersley-Green*, Glouc.	0	6	8	35
24	Th	*Faringhay*, Kent. *Faſt.*	0	33	9	28
25	F	St. James Ap. & M. *Derby*, *Doncaſter*	1	9	10	25
26	S	St. Anne, Mother to the bleſſed V. M.	1	55	11	8
27		9 Sunday after Trinity.	2	52	Morn.	
28	M	*Faitſa*, Cornw. *Winchcomb*, Glouc.	) Riſes		0	1
29	Tu	Dog Days begin.	9 A	3	0	51
30	W	*Caerlton*, Monm. *Laxton*, Camb.	9	24	1	42
31	Th	*Barkway*. Herts. *Uxbridge*, Midd.	9	42	2	30

M D	☉ Riſes	☉ Sets	☽ Riſes	☽ Sets	♀ Riſes	♂ Riſes	♃ Riſes	♄ Riſes	☉ Decl.
1	3h 45'	8 1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	3 48	8 [illegible]	[illegible]	9 59	11 7	2 53	9 4	4 0	21
11	3 53	8 [illegible]	[illegible]	9 37	10 50	3 1	9 7	4 41	55
16	3 58	8 [illegible]	[illegible]	9 16	10 35	3 10	9 5	5 29	
21	4 [illegible]	[illegible]	[illegible]	8 56	10 19	3 21	8 58	5 50	
26	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

AUGUST hath xxxi Days.

Last Quarter the 4th
New Moon the 10th
First Quartet the 18
Full Moon the 26th

Day at { 45 min. past 5 Morning. / 44 min. after Midnight. / 40 min. past 4 Afternoon. / 26 min. past 1 Afternoon.

M D	☉ Decl. North.
1	18° 36
6	16 35
11	15 8
16	13 35
21	11 57
26	10 14

1	F	**Lammas Day.** *Bath*, Som. *Lou.* L.	9 A	59	3 M 18
2	S	*Hedon.* Y. Fretum. *Wincheſt.* Hamp.	10	14	4 5
3	E	9 Sunday after Trinity.	10	35	4 53
4	M	*Daventry*, Northamp. *Thurok*, Yorkſh.	10	57	5 43
5	Tu	*Epſom.* Surry. Iſaac Tarrat, *Yarmouth.*	11	24	6 37
6	W	Tran ſig. of our Lord. *Boſton*, Linc.	Morn		7 33
7	Th	Name of Jeſus. *Falmouth*, Cornw.	0	2	8 33
8	F	*Purſut*, Cornw. *Ruthin*, Denb.	0	53	9 36
9	S	*Llanwiſt*, Denb. *Sherkin*, Midd.	1	57	10 39
10	E	10 Sunday aft 1 Trinity.	3	14	11 37
11	M	*Aberfraw*, Angleſea. *Allchurch*, Here.	☽ Sets		0 A 32
12	Tu	Old Lammas-Day, *York*, Chr. M.	8 A	29	1 22
13	W	*Northampton.* St. *Eades*, Hert. *Stow*, S.	8	47	2 9
14	Th	Days are ſhortened full 2 Hours.	9	3	2 54
15	F	*Rakewell*, Derb. *Preſton*, Lanc.	9	17	3 36
16	S	*Aſhborn*, Derb. *Giſborough*, Yorkſh.	9	33	4 19
17	E	11 Sund. after Trinity.	9	50	5 2
18	M	Day 14 h. 24 min. long.	10	10	5 46
19	Tu	*Dartington*, Devonſhire.	10	35	6 32
20	W	☉ Amplitude N. 16°. 35'.	11	8	7 20
21	Th	*Hearner*, Derb. *Horncaſtle*, Linc.	11	49	8 10
22	F	*Bracknell*, Berks. *Penkridge*, Staff.	Morn.		9 3
23	S	*Belford*, Northum. *Dinton*, Oxf. *Faſt.*	0	44	9 56
24	E	12 S. after Trin. St. BARTHOLOMEW	1	49	10 48
25	M	*Llanerchemith*, Angl. *Milver.* Som.	3	0	11 40
26	Tu	*Carliſle. Huntingdon. Worceſter.*	☽ Riſes		Morn.
27	W	*Coventry*, Warw. *Ripley*, York.	7 A	53	0 30
28	Th	St. Au. B. of Nip C. D.	8	10	1 20
29	F	**Beheading of John Bapt.**	8	27	2 8
30	S	☉ due E. 6 ho. 30' Alt. 12°. 27'.	8	45	2 56
31	E	13 Sunday after Trinity.	9	7	3 46

M	☉ Riſes	☉ Sets	☽ Riſe	♃ Riſes	♂ Sets	♀ Riſes	☿ Sets	Cl. ber. ☉
1	4h 19	7 40	9 A 17	8 A 11	9 A 45	3 M 50	8 A 31	5' 45"
6	4 27	7 32	8 57	7 50	9 31	4 6	8 14	5 20
11	4 35	7 24	8 37	7 29	9 17	4 23	7 56	4 39
16	4 44	7 15	8 19	Sets	9 4	Sets	7 36	3 44
21	4 53	7 6	8 0	4 M 19	8 51	7 18	7 13	2 37
26	5 2	6 57	7 42	3 57	8 38	7 A 12	6 50	1 19

SEPTEMBER hath xxx Days.

M D	☉ Decl. North.
1	8° 0 5
6	6 14
11	4 29
16	2 24
21	0 18
26	1 S 20

Last Quarter the 2d
New Moon the 9th
First Quarter the 17th
Full Moon the 24th
} Day at { 11 in the Forenoon. 19 min. before Noon. 35 m. past 11 Foren. 7 m. past Midnight.

☉ Enters ♎ 22 D. 3 H. 42 min. apparent Time.

1	M	Giles Abb. & C. *Northmoore*, Wilts	9	A 52	4	M 40
2	Tu	*Richmond-Rood*, North.	10	6	5	35
3	W	*Brecknock*, 6 Days. *Bridgestock*, Dev.	10	52	6	38
4	Th	*Bartholomew*, Lon. *Norw. Dover*. Kent	11	52	7	34
5	F	*Chipping Norton*, Oxf. *Fenningham*. Suf.	Morn.		8	30
6	S	Do. Days end. *Falkingham*. Linc.	1	4	9	35
7	E	14 Sunday after Trinity.	2	21	10	29
8	M	Nativ. of the B. V. M. *Northamp.*	3	42	11	21
9	Tu	*Devises*, Wilts. *Stourbridge*, Worcest.	☽ Sets		0	A 9
10	W	Day 12 hours 56 m. long.	7	A 15	0	54
11	Th	*Tallowdown*. Dorsetsh.	7	31	1	37
12	F	*Downderry-Hill*. Som. *Whitehaven*, C.	7	46	2	21
13	S	*Iron-Acton*, Gl. *Newt*. Lan. *Tregony*, C.	8	1	3	3
14	E	15 Sunday after Trinity. Holy-Cross	8	20	3	46
15	M	*Durham*. (L. Elstob.)	8	44	4	33
16	Tu	*Lutterworth*. Leic. *Newcastle*, Staff.	9	13	5	20
17	W	Ember Week. *Probus*, Cornw.	9	50	6	8
18	Th	*Nethestow* Som. *Southw. Stirbitch*, Ca.	10	39	6	58
19	F	*Carlisle*, Cumb. *Huntingdon. Worcest.*	11	39	7	53
20	S	*Devizes*, Wilts. *Gisbo*. Y. *Manchester*,	Morn.		8	46
21	E	16 Sunday after Trinity. St. Matth.	0	48	9	38
22	M	Equal Day and Night. *Allchurch*. W.	2	2	10	28
23	Tu	*Halkin*, Wilts. *Paincastle*, Radnor.	3	23	11	18
24	W	*Cheshunt*. Hertf. *Wickware*, Glouc.	4	44	Morn.	
25	Th	*Hedon*, Y. Fretum. *Chesterfield*, Derb	☽ Rises		0	9
26	F	St. Cyprian, Archb. of Car. & M.	6	A 58	0	58
27	S	*Clapham*, Yorksh. *Northall*, Midd.	7	20	1	48
28	E	17 Sunday after Trinity.	7	44	2	42
29	M	St. Michael, and all Angels.	8	15	3	39
30	Tu	St. Jer. Pr. C. & D. *Wrexham*, Denb.	8	58	4	37

M. D.	☉ Rises	☉ Sets	☽ Rises	☽ Sets	♂ Sets	♀ Sets	♄ Sets	Cl. aft. ☉
1	5h 13	6 46	7 A 19	3 M 22	8 A 24	7 A 3	6 A 23	0 30
6	5 23	6 36	7 0	3 10	8 13	6 55	Rises	2 05
11	5 33	6 26	6 41	2 49	8 2	6 47	4 M 13	3 47
16	5 43	6 16	Sets	2 30	7 51	6 38	4 0	5 32
21	5 52	6 7	5 M 32	2 9	7 41	6 30	4 9	7 16
26	6 2	5 57	5 12	1 49	7 32	6 22	4 22	8 57

OCTOBER hath xxxi Days.

			M D	☉ Decl. South
Last Quarter the 1st		25 min. past 5 Afternoon.	1	3° 27
New Moon the 9th		46 min. past 1 Morning.	6	5 23
First Quarter the 17	Day at	27 min. past 6 Morning.	11	7 17
Full Moon the 24		32 min. past 10 Morning.	16	9 9
Last Quarter the 31		1 min. after 2 Morning.	21	10 58
			26	12 42

		B. of Rhemes.	9A	53	5M	38
2	Th	*Nottingham*, lasts 8 Days, for Hops,	11	1	6	39
3	F	Cheese and all Sorts of Cattle	Morn.		7	39
4	S	*Katering*, Northamp. *Penkridge*, Staff.	0	18	8	34
5	E	18 Sunday after Trinity.	1	37	9	26
6	M	Fair), V. & M. *Hull*, Yorksh.	2	55	10	13
7	Tu	*Billericay*, Essex. *Countess-Court*, Wilt.	4	10	10	59
8	W	*Abingdon*, Berks. *Challock*, K. *Swansey*.	5	25	11	43
9	Th	Fair. Areop. B. & M. *Lancast.*	☽ Sets		0A	25
10	F	Old Michaelmas-Day. *Barnsley*.	6A	16	1	8
11	S	*Leicester*, *Bedal*, Y. St. *Albans*, Hertf.	6	33	1	50
12	E	19 Sunday after Trinity.	6	54	2	35
13	M	Translat. of K. Ed. Conf. *Salisb.* Wilts	7	20	3	22
14	Tu	*Bretonmoor*, Shropsh. *Worksop*, Not.	7	52	4	9
15	W	*Tatsley*, Warw.	8	35	5	0
16	Th	*Bosworth*, Leic. *Hay*, Breckn.	9	31	5	52
17	F	Etheldred, Virg. *Lynn*, Norf.	10	35	6	44
18	S	St. Luke the Evangelist. *ank* Staff.	11	47	7	36
19	E	20 Sunday after Trinity.	Morn.		8	24
20	M	*Ilkborne*, Derb. *Co'chester*. *Hereford*.	1	5	9	13
21	Tu	*Hanner*, Derb. *Banbury*, O. *Gainsb.* L.	2	23	10	2
22	W	King Geo. II. crowned, 1727.	3	44	10	51
23	Th	*Ripley*, Derb. *Saff. Wald.* Eff. *Stock.* Ch.	5	8	11	43
24	F	*Tamworth*, Staff. *Windsor* Berks	☽ Rises		Morn	
25	S	Crispin, Mart. *Charing*, Kent.	5A	50	0	36
26	E	21 Sunday after Trinity.	6	18	1	33
27	M	*Alnwham*, D. *Buckingham*. *Warwick*.	6	57	2	32
28	Tu	St. Simon and St. Jude, Ap. & M.	7	49	3	33
29	W	*Newcastle upon Tyne*, lasts 9 D. (L. El.)	8	54	4	36
30	Th	*Banbury*, Ox. *Ely*, Cam. *Maidenhead*, B.	10	9	5	38
		Bridgenorth, Shrop. *Devizes*. *Settle*, Y.	11	29	6	35

☉	☉ Rises	☉ Sets	♄ Sets	4 Sets	♂ Sets	♀ Sets	☿ Rises	Clock ☉
1	6h 12	5h 47	4M 52	2M 30	7A 23	6A 14	5M 3	10 34
6	6 22	5 37	4 31	1 10	7 14	6 6	5 36	12 5
11	6 31	5 28	4 11	0 51	7 7	5 59	6 8	13 23
16	6 41	5 18	3 50	0 33	7 0	5 51	Sets	14 39
21	6 51	5 8	3 30	0 15	6 52	5 45	5 A1	15 22
26	7 0	4 59	3 10	11 A 58	6 46	5 40	5 10	15 57

NOVEMBER hath xxx Days.

M. D.	☾ Decl. South.
1.	24° 41
6	16 14
11	17 40
16	22 58
21	20 07
26	24 00

New Moon the 7th, First Quarter the 15, Full Moon the 22d, Last Quarter the 29 } Day at { 5 min. bef. 7 at Night; a quarter before Midnight; 5 min. bef. 9 at Night; half past 1 Afternoon.

			Morn	☽ M2
1	S	All Saints. *Coventry*, *W. Newark*, *Notts*		
2	E	22 Sun. aft. Trin. All Souls	0 41	3 D
3	M	On the Morrow of all Souls.	2 4	5
4	Tu	*Appleshaw*, Hants.	3 16	9
5	W	Papists Conspiracy. *Beverly*, Yorsh.	4 28	0 26
6	Th	Leonard, Conf. Term begins.	5 36	12 M
7	F	*Preston*, Lanc. *Wockingham* Berks.	☽ Sets	1 5
8	S	*Cirencester*, *Colchester*, *Hertford*, *Kendal*	5 A 1	0 A3
9	E	23 Sunday after Trinity.	5 23	1 22
10	M	K. Geo. II. born, 1683.	5 54	2
11	Tu	St Martin Bp. and Conf.	6 33	2 51
12	W	On the Morrow of St. Martin.	7 22	3 45
13	Th	Bricius, Bp. *York*, Ch. Mesban.	8 22	4 38
14	F	*Brecknock*, and five following Days.	9 30	5 25
15	S	Machutus, Bp.	10 43	6 11
16	E	24 Sunday after Trin.	11 59	7 T
17	M	Hugh, Bp of Linc.	Morn.	7 55
18	Tu	In eight Days of Saint Martin.	1 16	8 37
19	W	*Woodcot*: Oxf. *Yarme*, Yorksh.	2 35	9 20
20	Th	Edmund, K. & M.	3 52	10 M6
21	F	☽ eclipsed invis. 22d.	2 25	11 1
22	S	Cecilia, V. & M. Old Martin.	☽ Rises	Morn.
23	E	25 Sunday after Trinity.	4A 43	0 T
24	M	In 15 Days of St. Martin. (25)	5 30	1 46
25	Tu	Prince Will. Henry born.	6 32	2 20
26	W	*Castle-Town*, Monm.	7 47	3 21
27	Th	*Littlebury*, Essex.	9 7	4 M2
28	F	Term Ends. *Lincoln*. *Northampton*.	10 27	5 T
29	S	*Ashborne*, Derb. *Somerton*, Som. *Fast*	11 46	6
30	E	Advent Sunday, St. Andr. Ap. & M.	Morn.	6 T5
		Princess Dow. of Wales born 30.		

M	D	☉ Rises	☉ Sets	☽ Sets	4 Sets	♂ Sets	♀ Sets	♃ Sets	♄ Sets	☊ Sets	☉
	1	7h 11	4h 48	2M 45	11 A32	6 A40	5 M34	5 A 4	16	14	
	6	7 20	4 39	2 24	11 15	6 35	5 31	4 50	16	6	
	11	7 29	4 30	2 4	11 58	6 31	5 30	4 57	15	58	
	16	7 38	4 22	1 43	10 40	6 27	5 29	4 56	14	48	
	21	7 45	4 15	1 22	10 22	6 24	5 31	4 58	13	38	
	26	7 51	4 9	1 1	10 1	6 21	5 36	5 4	12	3	

DECEMBER hath xxxi Days.

New Moon the 7th	Day at	13 min. past 2 Afternoon.
First Quarter the 15		38 min. past 2 Afternoon.
Full Moon the 22		half past 7 Morning.
Last Quarter the 29		36 min. past 4 Morning.
☉ Enters ♑ 20d. 19h.		17 m. app. Time.

M D	☉ Ded. South
1	21° 58
6	22 38
11	23 6
16	23 22
21	23 29
26	23 24

				M	D	M	D
1	M	*Rotherham* Yorksh	Abr. Horstall	1	7	M	38
2	Tu	*Hoxne*, Suff.		2	12	8	20
3	W	*Darlington*, Durham.	(Luke Elstob.)	3	22	9	1
4	Th	*Bangor*, *Thwook*, Y.		4	32	9	42
5	F	*Colford*, Glouceſterſhire.		5	41	10	24
6	S	Nicol. Biſhop of Myra in Lycia.		6	50	11	8
7	E	2 Sunday in Advent.	☉ ecl. inv.	D Sets		11	56
8	M	Conception of the B. V. M.		4	A 22	0	A 43
9	Tu	*Bradford*, Wilts.		5	7	1	33
10	W	*Kimbolton*, Hunt.	*Newport*, Shrop *Sw*	6	4	2	23
11	Th	*Bewdley*, Worc	*Preſton*, L. *Roch.* Kent.	7	9	3	13
12	F	*Bedal*, York.	*Chorley*, Dev. *Shrewſbury*	8	18	4	1
13	S	Lucy, V. & M.		9	32	4	49
14	E	3 Sunday in Advent.		10	47	5	35
15	M	*Atherſtone*, Warw.	*Namptwich*, Cheſh.	Morn.		6	19
16	Tu	☽ Sapientia.		0	2	7	6
17	W	Ember Week.	*Exeter*, Dev. *Grantham*	1	20	7	53
18	Th	*Spalding*, Linc.		2	43	8	43
19	F	*Bedford*, Northampton.		4	8	9	35
20	S	Shorteſt Day.	(Faſt.	5	36	10	35
21	E	4 Sunday in Advent.	St. Thomas	7	5	11	39
22	M	*Newport-Keams*, Montgom.		D Riſes		Morn.	
23	Tu	Now *Saturdays* (Workmen obſ.) will		5	A 5	0	45
24	W	be the longeſt Days in the Week.	*F.*	6	28	1	50
25	Th	Christmas-Day.		7	52	2	54
26	F	St. Stephen 1ſt Martyr.		9	14	3	45
27	S	St. John Ap. & Ev.		10	31	4	33
28	E	1 Sunday after Chriſtmas.	Ho. Inno.	11	46	5	21
29	M	*Cockhill*, Som.		Morn.		6	4
30	Tu	*Maiden-Bradley*, Wilts.		0	57	6	48
31	W	Silveſt. B. of Rome		2	7	7	26

M D	☉ Riſes	☉ Sets	♄ Sets	♃ Sets	♂ Sets	♀ Sets	☿ Sets	Cl. aft. ☉
1	7h 57	4h 3	0 M 4 c	9 A 47	6 A 19	5 A 43	5 A 9	10' 19"
6	8 2	3 58	0 18	9 30	6 17	5 51	5 7	8 15
11	8 5	3 55	11 A 53	9 13	6 17	6 1	4 53	5 59
16	8 7	3 53	11 32	8 56	6 17	6 12	Riſes.	3 34
21	8 8	3 52	11 11	8 39	6 16	6 24	7 M 17	1 4
26	8 7	3 53	10 50	8 22	6 15	6 36	5 35	1 bef. 6

A TABLE of all the KINGS and QUEENS of *England*, since the Conqueſt,

Names.	The Year of the Birth of each King and Queen; alſo the Year, Month, and Day, whereon they began to reign: beginning the Year the firſt Day of January, 1758. Born	Began to Reign.	The Length of each Reign. Y.	M.	D	The Years expired ſince each Reign began and ended. Beg	End
William Conq.	1027	1066 October 14	20	10	26	693	672
William Rufus	1057	1087 Septem. 9	12	10	24	672	659
Henry I.	1068	1100 Auguſt 2	35	4	0	659	624
Stephen	1105	1135 Decem. 1	18	10	24	624	605
Henry II.	1134	1154 October 25	34	8	11	605	570
Richard I.	1156	1189 July 6	9	9	0	570	560
John	1166	1199 April 6	17	6	13	560	543
Henry III.	1207	1216 October 19	56	1	0	543	487
Edward I.	1239	1272 Novem. 16	34	7	21	487	452
Edward II.	1284	1307 July 7	19	6	13	452	433
Edward III.	1312	1327 January 20	50	5	1	432	382
Richard II.	1366	1377 June 21	22	3	8	382	360
Henry IV.	1367	1399 Septem. 29	13	5	21	360	346
Henry V.	1389	1413 March 20	9	5	11	346	337
Henry VI.	1421	1422 Auguſt 31	38	6	4	337	298
Edward IV.	1442	1461 March 4	22	1	5	298	276
Edward V.	1471	1483 April 9	0	2	13	276	276
Richard III.	1443	1483 June 22	2	2	0	276	274
Henry VII.	1457	1485 Auguſt 22	23	8	0	274	250
Henry VIII.	1492	1509 April 22	37	9	6	250	212
Edward VI.	1537	1547 January 28	6	5	8	212	206
Mary I.	1516	1553 July 6	5	4	11	206	201
Elizabeth	1533	1558 Novem. 17	44	4	7	201	156
James I.	1566	1603 March 24	22	0	3	156	134
Charles I.	1600	1625 March 27	23	10	3	134	110
Charles II.	1630	1649 January 30	36	0	7	110	74
James II.	1633	1685 February 6	4	0	7	74	70
William III.	1650	1689 Feb. 13	5	10	15	70	57
Mary II.	1662		13	0	23	70	65
Anne	1665	1702 March 8	12	4	24	57	45
George I.	1660	1714 Auguſt 1	12	10	10	45	32
George II.	1683	1727 June 11	whom God preſerve.				

A Compendious TABLE of INTEREST.

Shewing the Interest of any Sum of Money, from a Million to a Pound; for any Number of Days, at any Rate of Intereſt.

No.	£.	s.	d.	q.
1000000	2739	14	6	0,99
900000	2465	15	0	3,29
800000	2191	15	7	1,59
700000	1917	16	1	2,89
600000	1643	16	8	2,19
500000	1369	17	3	0,49
400000	1095	17	9	2,79
300000	821	18	4	1,09
200000	547	18	10	3,40
100000	273	19	5	1,70
90000	246	11	6	0,32
80000	219	3	6	0,96
70000	191	15	7	1,59
60000	164	7	8	0,23
50000	136	19	8	2,85
40000	109	11	9	1,48
30000	84	3	10	0,11
20000	54	15	10	2,74
10000	27	7	11	1,37
9000	24	13	1	3,23
8000	21	18	4	1,10
7000	19	3	6	2,96
6000	16	8	9	0,82
5000	13	13	11	2,58
4000	10	19	2	0,55
3000	8	4	4	2,41
2000	5	9	7	0,27
1000	2	14	9	2,14

No.	£.	s.	d.	q.
1000	2	14	9	2,14
900	2	9	3	3,12
800	2	3	10	0,11
700	1	18	4	1,10
600	1	12	10	2,08
500	1	7	5	3,07
400	1	1	11	0,50
300	0	16	5	1,40
200	0	10	11	2,30
100	0	5	5	3,01
90	0	4	11	0,71
80	0	4	4	2,41
70	0	3	10	0,11
60	0	3	3	1,81
50	0	2	8	3,51
40	0	2	2	1,21
30	0	1	7	0,90
20	0	1	1	0,60
10	0	0	6	2,30
9	0	0	5	3,67
8	0	0	5	1,40
7	0	0	4	2,41
6	0	0	3	3,76
5	0	0	3	1,75
4	0	0	2	2,52
3	0	0	1	3,80
2	0	0	1	1,26
1	0	0	0	1,63

RULE.

Multiply the Sum by the Number of Days; and that Product by the Rate per Cent. Then cut off the two laſt Figures to the Right Hand, and the reſt you muſt find in the Table.

Example, What is the Intereſt of 1000 l. for 365 Days at 5 per Cent.

No. of Days 365
multiply by 100
Product 36500
multiply by 5 Rate p. Cent.
1825100

Then in the Table againſt 1000 is 2 14 9 2,14
800 2 3 10 0,11
20 0 1 1 0,60
5 0 0 3 1,75
1825 5 0 0 1,82

Of the Eclipses of the *Luminaries* in 1760.

By Mr. Luke Elston, of *Elswick*.

On *May* the 29 at 34 min. after 9 at Night, the Moon will be eclipsed 0° 47′ in ♐ 8° 50′; visible.

June the 12 at 21 min. after 7 in the Morning, the Sun will be eclipsed 4° 35′ in ♊ 22° 36′; visible.

November the 22d at 15 min. after 9 at Night, the Moon will be eclipsed 6° 30′ in ♊ 1° 8′; visible.

December the 7 at 2 o'Clock in the Morning, the Sun will be eclipsed in ♐ 16° 2′; invisible.

Computations of the *Eclipses* of the Luminaries, which are expected to happen in the Year 1760. By Mr John Metcalfe, of *Wentworth-House*, *Yorkshire*.

First ☽ Ecl.	London.	Wentworth.	Richmond.	Lower Limb	La. ☽.
Beg.	9h 3′ 52″	8h 58′ 22″	8h 57 04″	☽ the 29th	52′ 13″ in.
vif. Ecl. &	9 22 31	9 17 01	9 15 43	Day of May	Dig. eclip.
Mid.	9 33 51	9 28 21	9 27 03	P. Meridiem.	42′ 39″
End.	10 3 50	9 58 20	9 57 02	App. Time.	Duration.
				S. ☽ 14′47″ 2/3	59″ 58″.

Eclipse of the Sun.

	London.			But, from some other numbers, this Eclipse will beg. and e. somewhat *later* (viz.)		
Begins	6h	32′	42″	13 June		
Visible Ecliptic ☌	7	15	15	Ant. Mer.		
Middle	7	18	36		h	m
Ends	8	06	54	Apparent.		
Time of Incidence		45	54	Time.	Beginning	6 42
Ditto of Repletion		48	18		Middle	7 22½
Duration	1	34	12		End	8 16
Dig. Ecl. on the lower Side	4°	42	29	Visible.		

The Center of the *Lunar Penumbra*, in this Eclipse descends on the Globe, upon the Western Coasts of *Africa* 6h 36′ 23″ Apparent Time, A. M. in Latitude 12° 58′ N and in Longitude 14° 47′ West from *London*, a little to the South of the Influx of the River *Gambia*; and soon after crossing that great River, it takes its Course over the inland and unknown Parts of this large *Peninsula* (viz.) *Zaara*, *Bilidurgerid*, and *Tripoli*; and traversing the *Mediterranean* a little to the North of *Candia*, it enters the lesser *Asia* near *Smyrna*, still tending North-Easterly and pursuing its Direction towards the *Caspian Sea*, passing the Southern Coasts of the *Euxine Sea* over *Georgia*, and directly over the *Caspian Sea*, into *Siberia*; where in Lat. 47° 48′ North, and in Long. 72° 20′ East from *London*, the Central Shade makes its nearest Approach to the North Pole; from whence it bends South-Easterly, and continuing

its Course through *Siberia*, the Northern Parts of *China* and the Bay of *Nanking*; and in the great Eastern Ocean, in Latitude 29° 59′ N. and in Longitude 137° 7′ East from *London*, to the South of *Japan*, the Center of the Penumbra rises off the *Earth* into the *Expansum*; 9h 46′ 41″. A. M. App Time.

Vis. L. Ec.	London.	Wentworth	Richmond.	L. ☽ 44′ 32″	Up. Lim. ☽
Beginning	7h 47′ 44″	7h 42′ 14″	7h 40′ 56″	S.	Dig. Ecl.
Ecliptic ☽	8 55 41	8 50 11	8 48 57	22 Nov. P.M.	6° 36′ 36″
Middle	9 03 01	8 57 31	8 56 13		Duration.
The End	10 18 18	10 12 48	10 11 30	App. Time.	2h 30′ 34″
				Semi Diam. ☽ =	16′ 51″

7th *December* an invisible *Eclipse* of the Sun about 25 min. past 1 o'Clock in the Afternoon, App. Time: it will be *Central*, but not *Total*, for the Moon is very near its *Apogæum*, and the Sun not far from its *Perigæum*; consequently the Moon's apparent Semidiameter is less than that of the Sun, by about 1′ 34″; which therefore is the Breadth of the luminous Annulus that will encompass the Moon at the Middle of the Eclipse.

In the preceding Calculations for the visible Eclipses of the Moon, I have added 50″ to the Semidiameter of the Shadow, for the Earth's *Atmosphere*, according to the Direction of Sir Isaac Newton; by which the Moon will visibly dip *deeper* into the Shadow than the horizontal Parallaxes alone make it; and consequently the Beginning will be a little *sooner*, and the End as much *later* as is the Difference of Immersion of the Moon's Limb, with, or without the *Atmospheric* Equation.—The following Computations for these two Lunar Eclipses are made from the Parallaxes only, the aforesaid Equation being wholly omitted.

May 29, 1760.	London.	Wentw.	Richm.	☽'s dist. a Node =	9° 30′ 03″
AM. app. T.	h m sec.	h m sec.	h m sec.	Eccentricity 65635	
Eclipse Beg.	9 11 50	9 06 20	9 05 02	Duration	44′ 02″
Ecliptic ☽	9 22 31	9 17 01	9 15 43	Digits eclipsed	23′ 11″
The Middle	9 53 51	9 28 21	9 27 03	☽ Horiz. Parallax	54′
End of the Ec.	9 55 52	9 50 22	9 49 04	Semidiam ☉ =	15′ 51″

Nov. 22, 1760.	London.	Wentwor.	Richmond	Eccentricity 65791	
PM. app. T.	h m sec.	h m sec.	h m sec.	☽'s dis. a No. ☽	9° 04′ 45″
Eclipse Beg.	7 50 12	7 44 42	7 43 24	Hor. Par. ☽ =	61′ 30″
Ecliptic ☽	8 55 41	8 50 11	8 48 57	Semediam. ☉ =	16′ 18″
Middle	9 03 01	8 57 31	8 56 13	Duration	2h 25′ 38″
The Ecl. ends.	10 15 50	10 10 20	10 09 02	Dig. obscr.	69′ 18″ 4/5

Wentworth House,
25 April 1759.

JOHN MICHELL.

Mr.

Mr. *Thomas Harris*, of *Bugbrook* near *Northampton*, favoured us with the following Computations of the Eclipses for 1760.

The Moon is eclipsed *May* 29 at Night, as follows from

Leadbetter's Tables. At *London* app. Time.				Moon's lower Limb. *Bugbrook*, app. Time.			
Begin *May* 29	8h	51′	02″		8h	47′	02″
Middle	9	22	36		9	18	36
End	9	54	10		9	50	10
Digits eclipsed		46′	32″			46′	32″

1760. *June* 13. Morning will happen a Solar Eclipse.

Brent's Tables, *London*. Manuscript Tables for *Bugbrook*.

Apparent Time, on the Sun's lower Limb.

	D	h	m	sec.	h	m	sec.
Beginning *June* 13		6	36	54	6	34	29
Middle		7	21	42	7	17	05
End		8	09	37	8	03	04
Digits eclipsed		4°	33′	42″	4°	08′	05″

REMARK. — At 29 min. past 5, Lat. 5° 17′ N. Long. 5° 29 E. the *Penumbra* first enters the Disk, and the Eclipse first of all begins at Sun-rising in the upper Edge of his Vertical Diameter, about *King's Citty*. At 6 ho. 27 min. Lat. 12° 43′ N. Long. 12° 44′ W. about *St. Philips* there will be a Central Eclipse at the very Rising of the Sun. At 7 ho. 36′ Lat. 41° 56′ N. Long. 46° 43′ W. on the Western Ocean, the Eclipse ends at Sun-rising in the lower Edge of his vertical Diameter. In Lat. 45° 51′ N. Long. 56° 29′ E. at 7 min. past 8, the Sun is centrally eclipsed in the Nonagesima Degree. At 8 ho. 9 min. Lat. 46°, 11′ N. Long. 57° 45′ E. the Sun is both Central and Total eclipsed in the Meridian on the Northern Banks of the *Caspian Sea*. At 8 ho. 30 min. Long. 178° 5′ W. the Eclipse begins at Sun-setting, in the lower Edge of his vertical Diameter. At 9 ho. 39 min. Lat. 28° 43′ N. Long. 138° 52′ E. there is a Central Eclipse at the very setting of the Sun. And, at 37 min. past 10, about the Isle of *Bashee*, Lat. 21° 25′ N. Long. 120° 22′ E. the Eclipse wholly ends, at Sun-setting, in the upper Edge of his Vertical Diameter, while his last Rays are about being hidden under the Horizon; having continued in passing over the Earth, about 5 ho. and 8 min.

N. B. The Longitude is taken from *London*.

1760. *Nov.* 22 at Night, the Moon is eclipſed, as follows,

LONDON.	D	h	m	ſec.	*Bugbrook.*	h	m	ſec.
Beginning	22	8	51	29		8	47	29
Middle		10	05	34		10	01	34
End		11	19	39		11	15	39
Digits eclipſed		6°	33	20″		6°	33	20

On the Moon's upper Limb. *Londoner*'s Tables, App. Time.

December 7th, at 2 in the Afternoon, the Sun is eclipſed, Vertical Eat. 22½ N. Long. 30° W. Viſible at the Iſlands of *C. de Verd*, and the *Atlantic Ocean*. Tho' this Eclipſe happens ſo long before Sun-ſetting, yet by reaſon of the Moon's great South Latitude, which is augmented by her Parallax, depreſſes her beneath the Sun's South Limb, and makes it inviſible to the Inhabitants of *Great Britain*.

He alſo remarks, that Mr *Luke Elſtob*'s Calculations of the Eclipſes for 1759, are taken verbatim from *Leadbitter*'s Aſtronomy. See Vol. I. p. 356, &c.

ANSWERS to the QUESTIONS in the laſt Year's DIARY.

(1.) Queſt. 186, anſwered by Mr. *John Buddles*.

Let $6x$ = AD; $4x$ = DC; $10x$ = AC. Then (by *Axiom* 4th of Plane Trig.) as $10x : 50 :: 10 - \frac{50}{x}$ = Difference of the Segments of the Baſe, made by letting fall a Perpendicular $\therefore 5x - \frac{25}{x} = \frac{5x^2 - 25}{x}$ = EC.

Then (by 47. 1. E.) we have $225 - \frac{625 + 50x^2 - x^4}{x^2}$ = BE². Alſo $400 - \frac{25x^4 + 250x^2 - 625}{x^2}$ = BE². Therefore $225 - \frac{625 + 50x^2 - x^4}{x^2} = 400 - \frac{25x^4 + 250x^2 - 625}{x^2}$.

This Equation reduced, we have $24x^2 = 375$; $\therefore x = \sqrt{\frac{375}{24}} = 3,9528$; hence the whole Baſe is 39,528; the Segment AD = 23,7168; and DC = 15,8112. Whence the Area of each Piece is eaſily found. Q. E. D.

The

The same answered by Mr. *Geo. Guthrie*.

In the Triangle ABC (see fig. above) AB=30, BC=20, BD=15; and for AD put $3x$, and DC $2x$; then $\frac{900-225-9x^2}{90x} = \frac{225+4x^2-400}{60x}$ = Cosine ADB = Cosine BDC=,98742; therefore the Area of ABD=175,6404, and the Area of BCD=117,0936 square Chains.

Mr. *Timothy Drury's* Scholar, Master *E. Rawsterne's* Answer.

Let $a=15$, $b=20$, $c=30$; and $x=$DE (see Fig. above). Then $\sqrt{a^2+x^2}=$BE; and $\sqrt{c^2-a^2+x^2}-x=$AD; $\sqrt{b^2-a^2+x^2}+x=$CD; then $\sqrt{c^2-a^2+x^2}-x : \sqrt{b^2-a^2+x^2}+x :: 3 : 2$ (by Queſt.) and by mult. of Means and Extremes, and ſubſtituting s for the Sum of all the known Terms, and c for the Coefficients of x^2, we get $x=\sqrt{\frac{s^2}{c}}=2,3713$, whence AC = 39,528; and the two Areas=175,6413 and 117,0892. W. W. R.

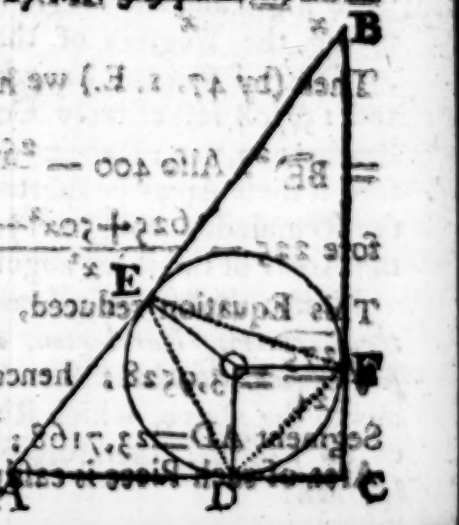
Mr. *Chris. Meſſian* gives the following Solution.

Let fall the perpendicular BE (ſee laſt fig.) then $\overline{BC}^2 - \overline{EC}^2 = \overline{BE}^2$. And $\overline{BE}^2 + \overline{DE}^2 = \overline{BD}^2$. Then I aſſume AC=40, and proceed as if it was the true Side, but find BD only 14,7; therefore I call AC only 39,5, and by proceeding as above, I at laſt find AC=39,52847. Ergo AD =23,717082 and DC=15,811388. Hence the Area of the

	A	R	P		A	R	P
Triangle ABD is found=	17	2	10¼	; and BDC=	11	2	33¼.

Meſſrs. *Barker*, *Barnett*, *Boſton*, *Coram*, *Eaton*, *Foſter*, *Goodhead*, *Green*, *Harrington*, *Hartley*, *Holroyd*, *Kingſton*, *Metcalfe*, *Stone*, *Scott*, *Ward*, and others ſent Solutions to this Queſtion, which Room will not permit us to publiſh.

(z) Queſt. 187, anſwered by Mr. *Joſeph Scott*.



Given AC=30, BC=40, and AB=50; ∴ the Radius of the inſcribed Circle=10; and AD =AE=20, alſo EB=BF=30. Then by *Trig.* the ∠s at A, and B will be found =,6 and ,8; and alſo, the Areas of the Segments of ED, DE, and EF = 28,54; 71,6935, and 94,3416 reſpectively: And the Areas of the Triangle CDF, ADE, and BEF=6,166, and 270 reſpectively: From which ſubtracting

the Areas of the Segments adjoining, and we ſhall have for Areas at each Angular Piece; (viz.) at C, = 21,46; at A, 89,3065; and at B, 175,0584 Square Chains.

The ſame anſwered by Mr. *William Eaton*.

Firſt, it is plain the Triangle is a right angled one: Therefore let ABC (ſee Mr. *Scott's* Fig.) be the Piece of Ground; EFD the Pond; AC=30, BC=40; and AB=50. Now, by plane Trigonometry the Angles may be found; ∴ the Angle at B = 36° 52′ 42″, whoſe Supplement is 143° 7′ 18″ = the Angle EOF, and the Angle at A=53° 7′ 18″, whoſe Supplement is = 126° 52′ 42″ = the Angle EOD; and the Radius OD=OF=OE=10; ∴ BE = 30 = BF; and AD = 20 = AE; and the Area of the Trapezium BEOFB=BE × EO=30×10=300; alſo the Area of the Sector EOF, will be found = 124.89654; which, ſubtracted from 300, leaves 175,10342=the Area BEF; after the ſame Manner the Areas AED are found = 89,2824; and CDF,=21,459. Q. E. I.

The ſame anſwered by Mr. *Turner Boſton*.

Having all the Sides given find the ∠ABC = 36° 52′ (ſee Fig above) ∠ BAC = 53° 8′, ∠ DOE = 126° 52′, ∠FOE=143° 8′, and ∠FOD=90°, and by a well known Theorem, the Rad. $= \frac{AC+CB-AB}{2}$ = FO=10. Whence the Area of each Sector is DOE = 110,711812 Chains; FOE = 124,907398; and FOD = 78,54 Chains: Then the Area of each Piece (viz.) the Piece A=8A, 3R, 29P. Piece B = 17A, 2R, 1 P. And the Piece C=2A, 0R, 23P, as was required.

Mr *Thomas Barnett*, of *Nottingham*, ſolves it thus:

Firſt, by Trigometry, I find the Angle B=36° 52′ (ſee ſame Fig) and the Angle A=53° 8′, therefore by multiplying the Degrees of the Arches DE, EF and FD by ,0087267 I find the Length of each to be 21,99; 25,13; and 15,708 reſpectively. Conſequently the Area of the Sector EmF=110,712; DnE=124,908; and DrF=78,54. Therefore if theſe Areas be ſubtracted from 300; 200; and 100; the Remainders will be 175,092; 89,283; and 21,46 = the Areas of the three angular Pieces required.

Meſſrs. *Buddlen*, *Crabtree*, *Drury*, *Eaſtery*, *Goodhead*, *Guthrie*, *Havil*, *Harrington*, *Hartley*, *Metcalfe*, *Reed*, *Robinſon*, *Rowe*, *Stone* and *Ward*, favoured us with good Solutions to the above, which Room will not conveniently permit us to publiſh; therefore proceed to the Solution of Queſt.

By Mr. *John Metcalfe*, of *Wentworth House*.

If the Sun's Declination equal its distance from the 6 o'Clock Meridian, which (if I understand the Question right) is the Proposers meaning; their Sum in the prime-vertical cannot be precisely equal to the Latitude on any Part of the Earth: For, at the Sun's greatest Declination when the Sum approaches nearest to that Equality, the Latitude exceeds the Sum 30 25 $\frac{1}{3}$. If this Approximation be sufficient; then the Latitude will be 47° 28 25 $\frac{1}{3}$, and the Time *June* 21 D. 7h. 33′ 56″ A. M.

The same answered by Mr. *William Kingston* of *Bath*.

Let x and y=Sine and Cosine of the Sun's Declination, =those of the Time from 6. Then, by the Problem; $2xy$, and y^2-x^2=Sine and Cosine of the Latitude; and (by *Spherics*) as $1 : \frac{y^2-x^2}{2xy} :: \frac{x}{y} : x \therefore x = \frac{y^2x-x^3}{2y^2}$; but $y^2 = 1-x^2$; whence it becomes, $x = \frac{1-2x^2}{2-2x^2} \therefore 1-2x^2 = 2x-2x^3 \therefore 1 = 2x+2x^2-2x^3 \therefore \frac{1}{2} = x+x^2-x^3$. Solved gives $x = .403014 = 23° 46' 5''$. But this is greater than the Sun's greatest Declination, and therefore impossible.

The same answered by Mr. *Steph. Hartley*.

Let x and y=Sine and Cos. of ⊙P = the Sun's Distance from the North Pole (Rad =1) = (by Quest.) Sine and Cos. of ⊙PZ. Then (by Quest.) $2xy$, and x^2-y^2=Sine and Cos of PH. Hence by common *Spherics* $1 : 2xy :: x : x^2-y^2$ ∴ by Substitution $y+y^2-y^3 = \frac{1}{2}$. Reduced, y=the Sine of 23° 46 nearly, not possible by the present Astronomy. But, if $2xy$ be put =ZP=the comp. of the Lat. sought, we have (by *Spherics*) $2xy : x :: y : \frac{1}{2}$ = the Sine of A⊙ ∴ $\frac{3}{4}$ = the Sine of ⊙Z. Then $1 : x :: x : \frac{3}{4}$ ∴ $x^2 = \sqrt{\frac{3}{4}}$ ∴ x=.9306 the Sine of 68° 32′ nearly, from which the rest is easily determined.

The same answered by Mr *Tho. Robinson*, the *Proposer*.

Let x and y=Sine and Cos. of the Time from 6 o'Clock, as also=the Sun's Declination. $2xy$=Sine Latitude of the Place; y^2-x^2=Cosine; then $\frac{y^2+x^2}{2xy}$ = Cotangent of the

Latitude,

Latitude, by *Spherics*, $\frac{1}{2}$ — $\frac{1}{2}$ = Cotang. Latitude. Then $\frac{x^2}{1-2x}$ + $\frac{2xy}{1}$ + y^2 = 1, then will y = $\frac{1}{2}$ — $\frac{x^2}{2}$. Hence x^2 + x — $\frac{1}{2}$ = ,50000 and x = ,39699 = 23° 23′ = the Sun's Declination. Answering to *June* 16 Day, the Time that the Sun was due East 32 min. past 7 o'Clock, and the Lat is 46° 16′ *North*.

Mr. *John Buddles* brought out the very same Solution as Mr. *Robinson*'s.

(4) Quest. 189. Answered by Mr. *John Buddles*, of *Chester-le-Street*.

Put b = Co Declination, rad 1. x = Sine ½ Sum of ⊙ Altitude and Azimuth; y = Cosine, s = 28° 21′ the Sine of their Difference; q = Cosine. Then $sq + qx$ = Sine Azim. and $qx - sy$ = Sine Altitude at 6; $qy + sx$ the Cosine. Then by *Spherics*, as $1 : qy + sx :: sy + qx : b$; this properly reduced, we get $2xy$ = ,99856; hence the Latitude is 51° 32′ N. and Altitude at 6 = 18° 11′. Q. E. D.

The same answered by Mr. *Tho. Robinson*.

Put b = 66° 31′ Comp. Sun's Declination; rad. = 1; and let x and y = Sine of ½ Sum and Cosine of the Sun's Altitude and Azimuth. Also s = 28° 21′ the Sine of ½ their Difference, and q = Cosine: then (by *Spherics*) $sy - qx = 0$ Azimuth from the North Easterly, and $qx - sy$ = the Sun's Altitude at 6 o'Clock; $qy + sx$ = Cosine. Again (by *Spherics*) $1 : qy + sx :: sy + qx : b$ ∴ $qsy^2 + s^2xy + q^2y + sqx = b$. Now $y^2 + x^2 = 1$; and $s^2 + q^2 = 1$; then, in the last Equation we have $xy = b - sq$ = ,49928; but $2xy$ = ,99856 = the Nat. Sine 86° 56′ and 180° − 86° 56′ = 93° 4′ ∴ z = 46° 32′ = the ½ Sum of the Sun's Altitude and Azimuth. Then 46° 32′ + 28° 21′ = 74° 53′ the Sun's Azimuth from the North, the Sun's Altitude is 18° 11′ and the Latitude is 51° 32′ North.

Mr. *Henry Green* solves the same Question thus.

Put s and q = the Sine and Cosine of $\frac{\text{Ang. } 56° 42′}{2}$ = 28° 21′; c = the Cosine of 23° 29′ (Rad = 1) x and y = the Sine and Cosine of ½ the Sum of the Sun's Altitude and Azimuth at 6; then will $qx + sy$ = Sine, and $qx - sy$ = Cosine of the Az. from North; and $qx - cy$ = Sine, and $cy + x$ = Cosine of Alt. Then, by a known *Theorem*, we shall have $cqx + sy = cy + x$ and $x^2 + y^2 = 1$. Consequently by substitution and Reduction $2xy = 2c - 2sq$, whence the Lat. is found 51° 32′. Q. E. I.

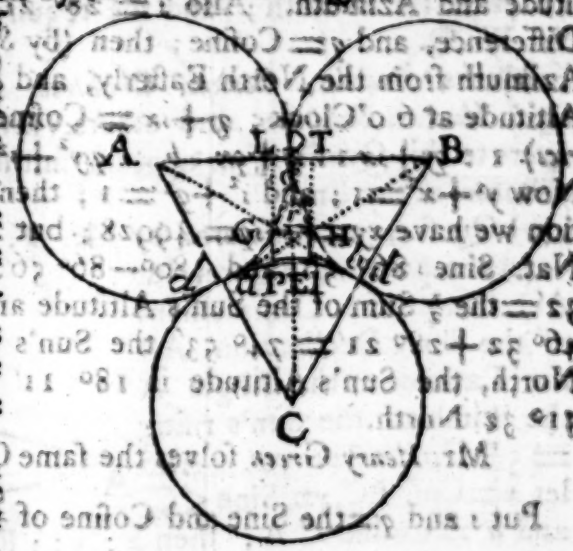
Mess.

Messrs. *Barker*, *Goodhead*, *Hartley*, *Holroyd*, *Hudson*, *Stone*; and several other of our worthy Contributors favoured us with good Solutions to this Question: but we presume the above are sufficient.

Quest. 190. Answered by Mr. *John Goodhead* of *Nottingham*.

Let DEF represent the given curvilineal Triangle, *mrn* the required Parallelogram; but the Radius of the given Circles = 20 = *r*; 14,64 = D*r* = *a*; and $x = mo = no$. Then from the Property of the Circle, we have $\sqrt{2rx - x^2} = pn = Do$, and $a - \sqrt{2rx - x^2} = ro$, consequently $ax - x\sqrt{2rx - x^2}$ is a *Max.* in Fluxions it is $ax - \frac{2rx^2 - x^3}{\sqrt{2rx - x^2}} = 0$. Which reduced and brought into Numbers is $x^3 - 60x^2 + 933,6824x = 2143,296$. Hence $x = 2,67596$, $ro = 4,641$; and Area = 24,83826.

The same answered by Mr. *William Kingston* of *Bath*.



To the Points of Contact *d*, *d*, and D draw DC, A*d* and B*d*, which bisect the Angles of the Triangle ABC, and are perpendicular to the Sides; draw the Tangents *ab*, *ac* and *bc*; which will form the equilateral Triangle *abc*.

Now, the greatest Parallelogram that can be inscribed in the curvilineal Triangle *d*D*d*, will be equal to the greatest Parallelogram that can be inscribed in the equilateral Triangle *abc*, the Altitude of which is known to be = ⅓ the Altitude of the Triangle. Now in the Triangle BHT are known all the Angles, and Side BH; from whence are found TH = 16, and BT = 17,3205, and DT = BD − BT = 1,19751. Whence 2DT = TL − FI = 2,6795. And by

the

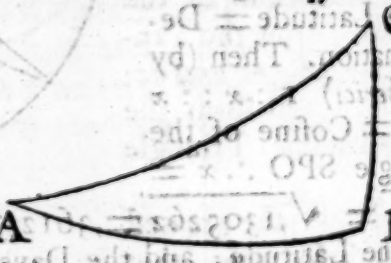
the same we find DC=34,641. Whence also DC—CE—DF (=IH)=EF=IH=PG=4,641. Then the Area is found=24,87112

The same answered by Mr. *Robert Williams*, of *Hemiton, Devonshire.*

Join the three Centers A, B, C, of the three Circles, then it is evident the three Sides will pass through the three Points of Contact, and the △ ABC, is equilateral, and each Side equal the Diameters of the given Circle=40. By *Trigonometry*, &c. *bd* is found=14,641. Draw *en* parallel to *bd*; and let the Radii B*m* =B*d*=20=*r*; *bd*=*en*=14,641=*a*; *be*=*mo*=*nd*=*x*= half the Parallelogram's Length; then *r*—*x*=B*n* by (47 E. 1) $\overline{2rx-x^2}^{\frac{1}{2}}=mn=od$, and $a-\overline{2rx-x^2}^{\frac{1}{2}}=mo=bo$, the Parallelogram's Breadth, $\times 2x=2\times ax-2rx^{\frac{3}{2}}-x^{\frac{4}{2}}=m$, which is to be a *Maximum*. In Fluxions $a\dot{x}-\frac{3r\dot{x}^2\dot{x}-2x^3\dot{x}}{\overline{2rx^3-x^4}^{\frac{1}{2}}}=0$. Reduced $4x^3-12rx^2+9r^2x+a^2x-2a^2r=0$. And $x=2{,}68$; $2x=5{,}36$=the Length; 4,641=the Breadth; and the required Area=24,8704. W. W. D.

Messrs *Buddles*, *Coram*, *Crabtree*, *Eaton*, *Hartley*, *Holroyd*, *Hudson*, *Robinson*, and others, favoured us with Answers to this Question, as appears in the Catalogue of Contributors at the End.

(6) Quest. 191 Answered by Mr. *W. Bevil* of *Harpswell*.



In the annexed Figure, let AC denote the Complement of the Sun's Declination; AB the Latitude; the Angle A the Time of the Sun's rising =5½ Ho.=82° 30′. Also let *x*=Cos. BC, *y*=Sine ∠C, and *a*=Cosine ∠A; then *x* : *y* : : Fluxion AC : Fluxion AB; and by *Trigonometry*, *y* : *a* : : 1 (rad) : *x*. ∴ $yx=a$, or $y=\frac{a}{x}$; which being put for *y* in the Analogy above, we have $x:\frac{a}{x}::$ Fluxion AC : Fluxion AB; but the Fluxion AC—the Fluxion AB=0, when a *Maximum*, therefore Fluxion of AC=Fluxion AB; whence it is evident

that

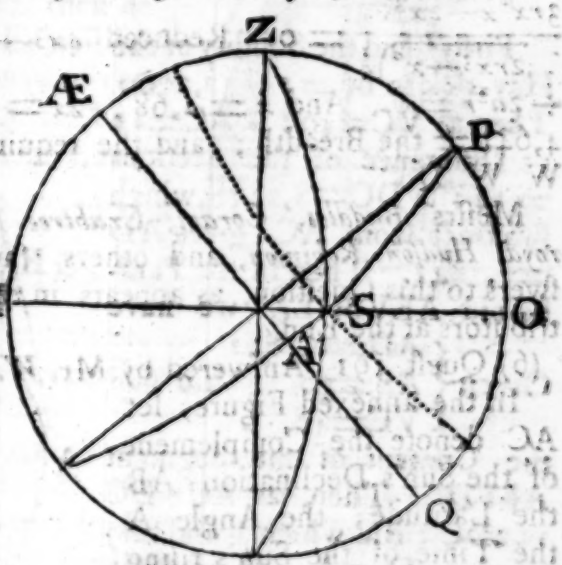
$\frac{a}{x} : \frac{x}{1} :: 1 : 1 \therefore x^2 = a$. Whence $x = a^{\frac{1}{2}} = ,3612840$98.

Therefore AC = 70° 8′ 8″ 34‴ the Cosine of the Sun's Declination; and AB = 9° 51′ 51″ 26‴ the Sine of the Latitude; which shews the Latitude and Declination are equal.

The same answered by *Tabularius*.

Put s = Sine 7° 30′ the given ascensional Difference; and x = Tangent of the Latitude; then, by *Spherics*, Radius $= 1 : s :: \frac{1}{x} : \frac{s}{x} =$ Tang. of the Declination, $\therefore \frac{x}{s} =$ Tang. of the Co. Declinat. Whence $\frac{x - sx}{s + cx} =$ Tang. of the Difference betwixt the Co. Declination and the Latitude; and $\therefore x - sx \times s + x^2 - 2x \times s - x = 0$; from which $x = s\frac{1}{2} \left(= \frac{s}{x}\right) = ,361284 =$ Tang. 19° 51′ 50″ = the Latitude, and also the Declination answering to the 20 Day of *May*, and 24 of *July*.

The same answered by Mr. *John Hudson*, of *Louth*.



It is evident that when PS = PO is a *Maximum*, that PO − SA will be a *Minimum*; which must be when they are equal, or their Difference nothing; this being premised, put x = the Tangent of the Latitude = Declination. Then (by *Spherics*) $1 : x :: x : c$ = Cosine of the Angle SPO $\therefore x = \sqrt{\quad} = \sqrt{,1305262} = ,3612702$ answering to 19° 51′ 47″ = the Latitude; and the Days are *May* 19, and *July* 24.

The same answered by Master *W. Hutchinson*, at Mr. *Allen's* School in *Spalding*.

Let x = the Tangent of the required Latitude, a = Sine of the Sun's ascensional Difference; Rad. = 1, then will $\frac{x}{a}$ = Co-Tangent of his Declination: and (by the Question) $x - ax$

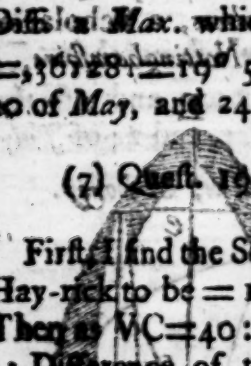
$\frac{x-ax}{e+xx}$ will be a *Maximum*: Solved $x=\sqrt{ae}-e$

,361284 the Tangent of 19° 51′ 50″ = the required Latitude = Declination North, and answering to *May* the 20th and *July* 24. W. W. R.

Answered also by Mr. *Tho. Harris.*

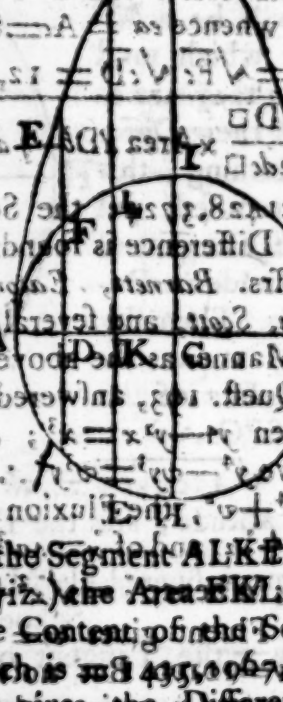
Put x = Tang. of Lat. and z = Cos. of the Hour $<$; then (by *Spherics*) $c : 1 :: x : \frac{x}{c}$ = Cotan. of the Sun's Dect. then (by *Trig.*) $1+\frac{x}{c} : 1 :: \frac{x}{c} : \frac{x}{1+c}$ = Tang. of the Diff. a *Max.* which, fluxed and reduced, gives $x=\sqrt{}$ =,361284 = 19° 51′ 50″ the Lat. = the Declination on the 20 of *May*, and 24 of *July*.

(7) Quest. 192, answered by Mr. *Thomas Coram.*



First I find the Solidity of the Hay-rick to be = 14137,2000. Then as MC = 40 : □ AC = 15 :: Difference of the Sections = 12 : □ DC = 8,2158, which subtract from AC, gives AD = 6,7842. Then in the Paraboloid AEVBHE*f*, we have

Given { AD = 6,7842 / AB = 30 / VC = 40, } To find the Content of the Segment AEFD. Then, as AC : DC :: EC : BK, which I find = 9 nearly. Then by a Proposition of Sir *Isaac Newton's* (viz.) 8 Times the Area of the Circular Segment AEDf, less the Area of the Segment ALKE (taken out of the Area of the Circle (=12) the Area EKLHE) multiplied by $\frac{1}{3}$ of VC = 81 = the Content of the Segment AEFD in the Paraboloid. Which is = 8435,0672, which subtracted from 14137,2000 gives the Difference = 5702,1328.



The same solved by Mr. *Thomas Barker*.

Put $a = BD = 30$; $b = HC = ac = 28$; $c = AH = 12$; $d = 0,2037$, and $x = fa$; Then cdx^2 = Solidity of the Conic-Sect. fAa, and $a^2 + x^2 \times bd$ = Solidity of the Frustum: Whence $cdx^2 + a^2 + x^2 \times bd = S$. (Whence also 14137,2 Feet the Hay-Stack's Solidity) $\therefore x = \sqrt{\frac{S - a^2 bd}{b + c \times d}}$ $= 16,143$. Then $BC = 28,215$ and $De = 6,735$, which being obtained $dc =$ may be easily found, and is 12,5551; whence the Difference of their Solidities was 11270, 6 Feet nearly. Q. E. D.

The same answered by Master *William Holmes*, a Scholar of Mr. *Geo. Wildbore*, at *Walnall* School, *Nottinghamshire*.

Let FED represent the given Hay-stack, whose Solidity is 14137,2 Feet, and $aDbd$ the *Slice*, or Part cut off; then ac being given $= 28$, Ee will be 12; and by the Property of the Parabola $AE : AD \square :: Ee : ea \square$; whence $ea = Ac = 8,215$; and $dc = \sqrt{Fc} \sqrt{cD} = 12,5557$. And $\frac{AD \square}{2dc \square} \times$ Area $aDd = \frac{1}{3} dc \times Ac \times ac = 1428,3724$; the Solidity of $aDbd$, whence the required Difference is found $= 11380,4442$ Feet.

Messrs. *Barnett*, *Eaton*, *Goodhead*, *Hartley*, *Kingston*, *Meehan*, *Scott*, and several others, answered this much in the same Manner as the above, whom we will oblige elsewhere.

(8) Queſt. 103, answered by Mr. *William Kingston* of *Bath*.

Given $y^4 - y^3 x = x^3$; $c = 10637,45$. Let $vy = x$, and we have $y^4 - vy^3 = v^3 y^3$. $\therefore y - v = v^3$. $\therefore y = v^3 + v$, and $yv = v^4 + v^2$, the Fluxion of $y = 3v^2 \dot{v} + 2v\dot{v}$, and of $yv = 4v^3 \dot{v} + 2v\dot{v}$. Whence $\dot{x} = \sqrt{\dot{x}^2 + \dot{y}^2} = \sqrt{16v^6 + 25v^4 + 16v^2} \dot{v}$, whose Fluent gives $v = 10$. Hence $y = v^3 + v = 1010$; and $yv = 10100$. But notwithstanding those are the true Values of x and y, as is evident from the given Equation $y^4 - y^3 x = x^3$, yet they will give but 10150,37375: Therefore I presume the Proposer has made a mistake in the number 1c63,745.

N. B. In Qu. 8. in last Year's Diary, for *Arc*, read *Area*.

The

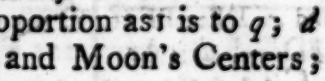
The ſame anſwered by Mr. *Tho. Crabtree*, the Propoſer.

Put $v = x$ in the given Equation, and it is $y = v^3 + v$ and $\dot{x} = v^4 + v^2$; in *Fluxions* $\dot{x} = 4v^3\dot{v} + 2v\dot{v}$; and $\dot{x}y = 4v^6\dot{v} + 6v^4\dot{v} + 2v^2\dot{v}$ = the Fluxion of the Area, whoſe Fluent is $\frac{4v^7}{7} + \frac{6v^5}{5} + \frac{2v^3}{3} = 10637,745 = a$; which reduced gives $v = 4$; conſequently $x = 68$, and $y = 272$.

(9) Queſt. 194, anſwered by Mr. *Henry Green*.

Let Q = the Quantity of Matter in the Earth; q that in the Moon; a the Diſtance of their Centers, and x = the Diſtance of the required Point from the Earth; then $a - x$ = its Diſtance from the Moon; Conſequently $\frac{Q}{x^2}$ = the Earth's Attraction, and $\frac{q}{a-x^2}$ = that of the Moon therefore $\frac{Q}{x^2} + \frac{q}{a-x^2}$ is a Minimum which in Fluxions and reduced is $q^{\frac{1}{3}}x + Q^{\frac{1}{3}}x = Q^{\frac{1}{3}}a$; and $x = \frac{Q^{\frac{1}{3}}a}{q^{\frac{1}{3}} + Q^{\frac{1}{3}}}$. W.W.R.

The ſame anſwered by Mr. *William Bevil*.



Let M be the Moon, and E the Earth, and the Quantity of Matter in each be in Proportion as 1 is to q; d the Diſtance between the Earth's and Moon's Centers; put $x = Ep$, then $d - x = Mp$, and will $\frac{q}{x^2} + \frac{1}{d-x^2}$ be a *Minimum*; which in *Fluxions* is $-\frac{2q\dot{x}x}{x^4} + \frac{2d\dot{x} - 2x\dot{x}}{d-x^4} = 0$; Or $\frac{-q}{x^3} + \frac{1}{d-x^3} = 0$; Then $x = \frac{dq^{\frac{1}{3}}}{1+q^{\frac{1}{3}}}$ = the Diſtance from the Earth, and $\frac{d}{1-q^{\frac{1}{3}}}$ = the Diſtance from the Moon where the Body may be placed to have the leaſt Attraction.

The ſame anſwered by *Aſtronomus* the Propoſer.

Q, and q, as the Maſſes of the Moon and Earth; a the Diſtance of their Centers; x, the Diſtance of the required Point from the Earth's Center. Then (by Art. 382. *Simſon's Fluxions*) $\frac{Q}{xx}$ is as the Earth's Attraction at the Diſtance

ance x, and $\frac{q}{a-x^2}$ that of the Moon; wherefore $\frac{Q}{xx}+\frac{q}{a-x^2}$ is a Minimum, and $\frac{-2Qx}{x^4}+2qx\frac{ax-xx}{a-x^4}=0$.

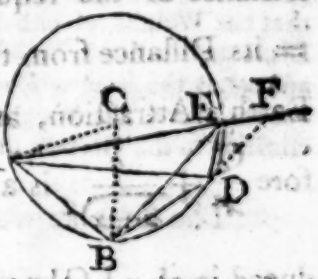
Therefore $q\times\frac{1}{a-x^3}=\frac{Q}{x^3}$; or $q^{\frac{1}{3}}x=Q^{\frac{1}{3}}a-Q^{\frac{1}{3}}x$;

Whence $x=\frac{Q^{\frac{1}{3}}a}{Q^{\frac{1}{3}}+q^{\frac{1}{3}}}$; where writing for Q, and q, the Quantities of Matter in the Earth and Moon respectively, the Diſtance x from the Earth's Center will be had.

(10) Queſt. 195, anſwered by *Tabularius*.

CONSTRUCTION.

In a right Line drawn at Pleaſure, take AF = AB + BD (=12) and make the ∠AFD=ADB=DAB; and on A, as a Center, with a Radius = 10 deſcribe an Arch cutting FD in D, and draw AD; alſo, on A and D, as Centers, with a Radius=6, deſcribe two Arcs interſecting each other in B, and draw AB, and BD; then draw BC biſſecting AD, and make the ∠CAB=CBA, and on C deſcribe the Circle ABD, in which draw the Chords DE, BE; and BE will be the Diagonal required.



DEMONSTRATION.

The ∠AFD=ADB=DAB, and AF=AB+BD by Conſtruction, and becauſe ABDE is inſcribed in a Circle, the ∠DEF=ABD (22 E. 3.) ∴ EDF=DFE, and ∴ DE=EF (6. E. 1.) and conſequently AB+ED=AB+BD.

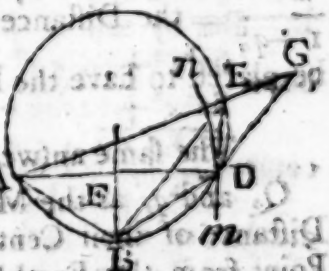
CALCULATION.

In the △AFD are given AF, AD, and the ∠AFD=33° 35′ 26″, to find the ∠DAF=7° 59′ 48″; whence the ∠BAE=41° 33′ 14″; and, becauſe the ∠AEB=ADB (21. E. 3.) in the Triangle AEB are given all the Angles and the Side AB, to find BE=7,2. and alſo AE=10,49 ∴ ED=1,51.

The ſame anſwered by Mr. *W. Kingſton*.

CONSTRUCTION.

Make AG=AB+BD=12, make the ∠DGE=half the Compliment of the Angle ABD, and draw DG; then with a Radius=10, and one foot in A, deſcribe the Arch *n m*, cutting DG in D; join AD, make the ∠EDG=EGD, biſſect AD in F by the perpendicular BF; draw BE parallel to DG cutting BF in B; join AB, and BD, and the thing is done.



DEMONSTRATION.

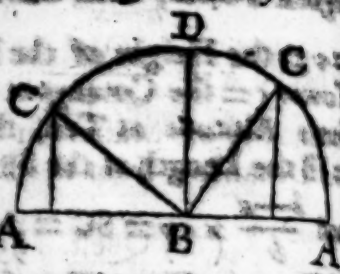
By Conſtruction GDE=DGE=the Compliment of the ∠ABD to a Semicircle (by 22 or 32 E. 3.) the ∠BED=DGE=half the Angle AED, whence AEB=BED, therefore AB=BD.

CALCU-

In the △ADC are given AC = 11; AD = 10; and ∠ACD = 33° 30″ from whence are found the ∠ADC = 108° 26′ 40″, DAC = 7° 59′ 50″; then in the △ABE are known all the ∠s and Side AE, whence BE is found = 7,2; and AE = 10,4895, also DE = 1,5106.

(11) Queſt. 196, anſwered by Mr. *Steph. Hartley*.

Let BC, BD, BC, repreſent the Axis of the Conic's Fruſtum, in as many different Inclinations to AB the Horizontal one. In Page 37 of the GENT. DIARY for 1751, there is this Proportion (viz.) As the Sum of both the Circular Areas, or Ends of any given Conic's Fruſtum, is to its whole Weight: ſo is the Area at either End of the Fruſtum: to its reſpective Preſſure upon its Supporter in an Horizontal Poſition.——Again, that the Weight of either End, while it is riſing, decreaſes as the even Degrees of a Circle (conſequently the other increaſes in the ſame Ratio) and not as the Sines or Chords. Hence, from the Data of the Queſtion, and the above, the Weight upon each of the Supporters at any given Inclination to the Horizon may be determined.

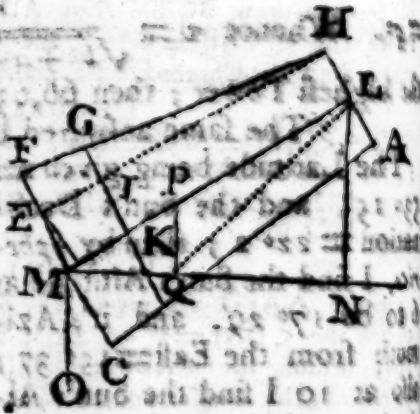


The ſame anſwered by *Aſtronomus*, the Propoſer.

Let QM, and NL be the two Supporters. Put the Length HE = a, Diameter greater End CF = c, and HA, that of the leſſer = d; call EF, n; HI = LK, x; Then, by Sim. Triangles $a : x :: n : \frac{nx}{a}$ = GI. ∴ $\frac{2nx+da}{a}$ = GB; and

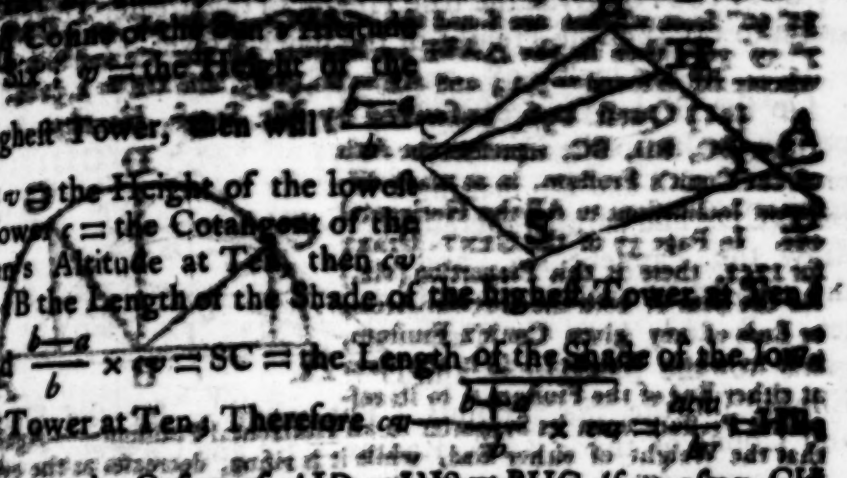
$$\frac{\text{Fluent } 4n^2x^3\dot{x}+4dan\,x^2\dot{x}+d^2x\dot{x}}{\text{Fluent } 4n^2x^2\dot{x}+4dan\,x\dot{x}+d^2a^2\dot{x}} = \text{LP, or the Diſtance, the}$$

Center of Gravity P, is from the extreme Point of the Axis L. But by taking the Fluents of the above Expreſſion we have $\frac{6n^2x^2+8dan\,x^2+3d^2a^2x}{8n^2x^2+12dan\,x+6d^2a^2}$; which, when $x = a$, becomes $\frac{6n^2+8dn+3d^2}{8n^2+12dn+6d^2} \times a$ = LP. Now let QP (perpendicular to the Horizon MN) paſs through the Center of Gravity P; and, let QL be drawn. Then, by *Mechanics*, MQ : QL :: Preſſure at L : Preſſure at M; which (ſince MP, and the ∠QMP are given) are readily found.



(12) Queſt.

(12) Quest. 1095, answered by Mr. W. Bevil.



Cosine of the Sun's Altitude = q, Height of the higher Tower, then will $\frac{b-a}{b} \times qv = SC$ = the Length of the Shade of the lower Tower at Ten; Therefore $\frac{b-a}{b} \times qv$ = the Cosine of AID = HIS = BHC (supposing it acute) the Difference of the Sun's Azimuth at Ten; then, by *Trig.* $HC^2 + HB^2 - HC \times HB \times$ Cosine $\angle H = BC^2 = v^2 + \frac{a^2c^2v^2}{b^2} - \frac{2acv^2}{b} = 85,6612$

$= q$. Whence $v = \frac{bq}{\sqrt{b^2 + a^2c^2 - 2abc}} = 66,63$ Yards the lowest Tower; then 66,63 Yards is the lowest

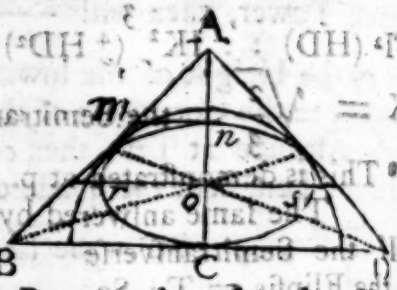
The same answered by Mr. *J. Hobrayd*.

The Latitude being given = D 30° 15′, and the Sun's Declination = 22° 2′; then by *Sphe-* E *rics*, I find the Sun's Altitude at 10 to be 17° 29′, and it's Azimuth from the East = 13° 37′; also at 10 I find the Sun's Altitude to be 51° 20′, and its Azimuth from the North = 38° 46′. Then in the Triangle DCE (supposing EC = DA = the Height of the higher Tower = 108.) And the $\angle DCE$ = 17° 29′ = the Sun's Altitude at 10 to find DE = 38,13, which taken from DA leaves AE = B = 68,65 = the Height of the lower Tower; also by *Trig.* find CE the Length of the Shadow of the higher Tower, also CB = 68,65 the Length of the lower Shadow: Then in the Triangle AEG, there are given E, and AE, and the $\angle GAE$ = 55° 43′ = the Diff. of from the North, to find BG = 85,95. Also in e Triangle BFG there are given BF, BG, and the $\angle FBG$

$= 70° 00'$; to find FG $= 85,66$. Therefore, as $88,33 : 85,66 :: 100 : 96,97 =$ the true Height of the greater Tower, and alſo $66,42 =$ the Height of the leſſer Tower. Q. E. I.

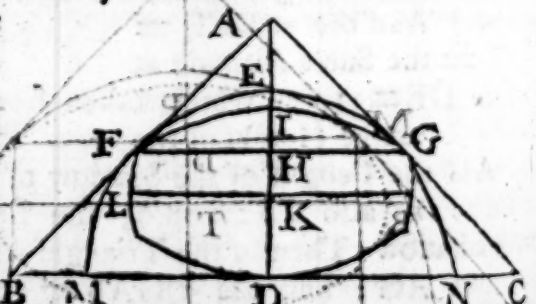
(13) Queſt. 198, anſwered by *Tabularius*.

On the Center C, erect CA perpendicular to the Diameter produced to B and D, making BC $=$ CD; and parallel thereto draw the Tangent *mn*, and the tranſverſe Axis *rs*; and let A B and A D be Tangents to the Semicircle and Eliptis, in the ſame Points. Put x and y, for the Sine and Coſine of the $\angle$BAC, Radius $= 1$; and C*n* $= v$; then will AC $= \frac{1}{x}$; BC $= \frac{1}{y}$; A*n* $= \frac{1-vx}{x}$; and by ſimilar Triangles *mn* $= \frac{1-vx}{y}$; and by the Nature of the Eliptis *rs* $= os = \frac{\sqrt{1-vx}}{y}$; whence $\sqrt{\frac{1-vx}{y}}$, or $\frac{v^2-xv^3}{y^2}$ is a *Maximum*, and $y^2 \times \frac{2v\dot{v}-3xv^2\dot{v}-v^3\dot{x}}{y^3} - 2y\dot{y} \times \frac{v^2-xv^3}{y^3} = 0$; from which $y^2 \times 2v\dot{v} - 3xv^2\dot{v} = 0$; and $v = \frac{2}{3x}$; alſo $2v^2x\dot{x} - 2v^3x^2\dot{x} - y^2v^3\dot{x} = 0$ (putting $\frac{-xx}{y}$ for $\dot{y}$;) and $v = \frac{2x}{2x^2+y^2} = \frac{2x}{3x} \therefore x = y =$ Sine $45° = \sqrt{\frac{1}{2}}$: Hence $v = \frac{2\sqrt{2}}{3} = ,942808$; and $rs = 2\sqrt{\frac{2}{3}} =$ 1,632993; the Dimenſions required. *Cor.* C*n* : *rs* :: $\sqrt{3}$: 3. And the Area of the Semicircle : Area of the Eliptis :: $3\sqrt{3} : 4$. Alſo the Triangle ABD having all its Sides biſected by the Points of Contact is the leaſt that will circumſcribe the Eliptis.



The ſame anſwered by Mr. *Charles Wildbore*.

Let MEN be the given Semicircle, and BAC its leaſt circumſcribing Triangle; then it is well known that the greateſt Semicircle Eliptis, Parabola, Parallelogram, &c. that can be inſcribed in this Triangle, will meet in the Points



and

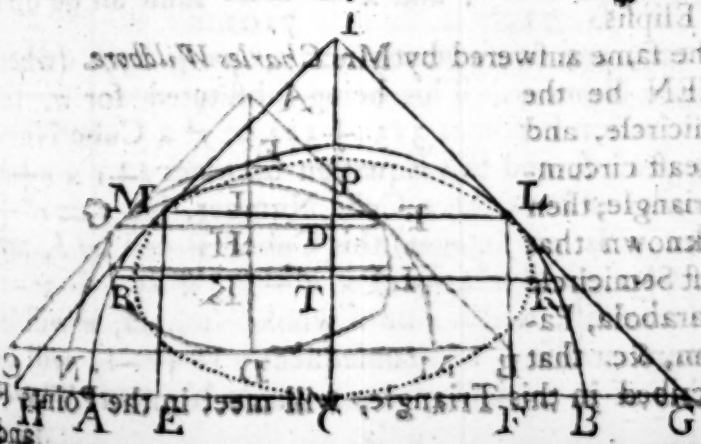
and G, so that AH = HD; and (by Property of the Fig.) AD = $\sqrt{2}$; and AH × HK = IH × HD; wherefore IH = HK, and ID = $\frac{2\sqrt{2}}{3}$ the conjugate Axis: Then $\frac{1}{3}$ HD² : FI² (HD) : : IK² ($\frac{4}{9}$ HD²) : LK² = $\frac{4}{3}$ HD² = $\frac{8}{3}$; whence LK = $\sqrt{\frac{2}{3}}$ = the Semitranſverſe Axis.

* This is demonſtrated at p. 504 of *Simpſon's* Fluxions.

The ſame anſwered by Mr. *John Goodhead*.

If the Semitranſverſe of the Elipſis = T; Semiconjugate = C; Radius = R; I ſay, that the Square of the Semitranſverſe is a mean Proportional, between the Difference of the Squares of the Semidiameters and Square of Radius; that is $\overline{RS}^2 - \overline{SD}^2 : \overline{RS}^2 :: \overline{RS}^2 : \overline{CD}^2$ which in Symbols is $\overline{T}^2 - \overline{C}^2 : T^2 :: \overline{T}^2 : \overline{R}^2$; whence by multiplying the Extremes and Means (R being = 1) we have $\frac{T^2}{\sqrt{T^2 - C^2}} = 1$. Therefore $C = \sqrt{T^2 - T^4}$. Conſequently $T\sqrt{T^2 - T^4}$ is a Maximum, its Square is a Maximum too (viz. $T^4 - T6$.) In Fluxions it is $4T^3 \dot{T} - 6T5\dot{T} = 0$. Reduced $T = \frac{2}{5}^{\frac{1}{2}} = ,816496$; and $C = ,471416$; Whence the Diameters are to one another as $\frac{4}{5}^{\frac{1}{2}} : \frac{8\frac{1}{2}}{3}$.

The ſame anſwered by Mr. *William Kingſton*.



Let $x = FL$, then $CF = \sqrt{1-x^2}$; and, $\sqrt{1-x^2} : x :: x : \frac{x^2}{\sqrt{1-x^2}} = FG$, and $\frac{x^2}{\sqrt{1-x^2}} + \sqrt{1-x^2} = \frac{1}{\sqrt{1-x^2}}$ $= GC$, and as $\frac{x^2}{\sqrt{1-x^2}} : x :: \frac{1}{\sqrt{1-x^2}} : \frac{1}{x} = CI$; and $\frac{1}{x} \times \frac{1}{\sqrt{1-x^2}} = \frac{1}{x\sqrt{1-x^2}}$ = the Area of the leaſt Triangle that will circumſcribe the Semicircle, and in Fluxions is, after being reduced, $2x^3\dot{x} - x\dot{x} = 0$ $\therefore x = \sqrt{\frac{1}{2}} = ,7071$, whence $CI = 1,4142$. Let $y = DP$, $c = ,7854$; then $\frac{x+y}{2}$ $= TC = TP$, and, by the Property of the Curve, as $xy : x^2$ $:: \frac{x+y^2}{4} : \frac{x}{4y} \times \overline{x+y}^2 = \overline{TR}^2$ $\therefore KR = \frac{x+y}{2} \times \sqrt{\frac{x}{y}}$; and the Area $= \overline{x+y}^2 \times c\sqrt{\frac{x}{y}}$, a Maximum and in Fluxions is $6x^2\dot{y}^2\dot{y} + 8xy^3\dot{y}^2\dot{y} + 3y^4\dot{y} - x^4\dot{y} = 0$. Solved, gives $y = ,2357$; whence $x+y = ,9428 = PC$ the Conjugate, and $\overline{x+y} \times \sqrt{\frac{x}{y}} = 1,633$ the Tranſverſe $= KR$; and the Area $= 1,189096$.

(14) Queſt. 199, anſwered by Mr. *Charles Wildbore*.

I am informed that this Queſtion is miſprinted (viz. $3\sqrt{}$ inſtead of $\sqrt[3]{}$ correcting which we have $\frac{323x + 30361}{7107} = y^3$. Now as $323x + 30501$ is diviſible by 7107, this multiplied by 22, or $7106x + 667942$; alſo $7107 - 7106x - 66794 = x - 93 - \frac{6991}{7107}$; and $x - \frac{6991}{7107}$ muſt all be diviſible by 7107, and conſequently $x = 7107n + 6991$ (where n is a whole Number.) This being ſubſtituted for x, the Original Equation becomes $323n + 322 = y^3$ a Cube Number. Let $322 = b$, and this Equation becomes $b+1 \times n + b$; Now, in order to have this a Cube Number, let $y = rb + r - 1$ (where r is an Integer) this Cube leſſened by b, and divided by $b+1$, gives $n = \overline{b+1}^2 \times n^3 - 3r^2 \times b+1 + 3r - 1$; where it is manifeſt, that if r be a whole Number, n will be a whole Number alſo; and conſequently $rb + r - 1$, will be ſuch a Value of y, as ſhall give n a whole Number. There-

fore,

fore, putting r equal to 1, 2, 3, 4, 5, 6, &c. the respective Values of y, they will be 322. 645. 968. 1291. 1614. 1937, &c. *ad infinitum*. The corresponding Values of x being easily found.

COROLLARY.

It may be observed that this only answers, when the Coefficient of n is $b+1$, which may be extended to these Cases when the Coefficient of n is either $\overline{b+1}^2 \times r^3 - 3r^2 \times \overline{b+1} + 3r - 1$; or $\frac{1}{c}$ (where c is a given Integer) the Value of n in the first Case, being $b+1$, and in the second $cy^3 - cb$; (where y may be taken at Pleasure.) But, if the Coefficient of n, be $\frac{d}{c}$ where both d and c are given Integers; then it will be necessary in order to have n a whole Number, that $\frac{cr}{d}$, and $\frac{3rc-c}{d}$ be Integers. Let $\frac{cr}{d} = v$, then will $\frac{3rc-c}{d} = \frac{3dv-c}{d}$; which shews that the Thing is impossible, unless c be some Multiple of d.

The same answered by Mr. *Tho. Moss*, the Proposer.

Wherein is a general Rule to solve it, or any other Question of the like Nature.

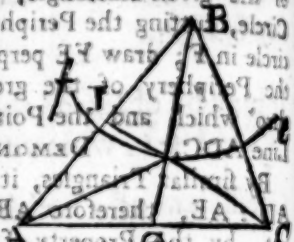
Let the Coefficient of the indeterminate Quantity be called a, the absolute Number b, and the Divisor c; then if $\frac{c-1}{a}$, and $\frac{b+1}{a}$; are both whole Numbers; then, I say, that every Term of an Arithmetical Series (which is formed by dividing the absolute Number by the Coefficient; and taking the Remainder of the first Term of the said Series, and the said Coefficient to be the common Difference) will be the Value of the Expression a whole Number, so as to bring out the Value of x a whole Number. Whence it is evident, that the Six Values of the Expression in whole Numbers are 322. 645. 968. 1291. 1614. and 1937. Therefore,

When $\sqrt[3]{323x+3036} - 7107$ $\left\{\begin{matrix} =322 \\ =645 \\ =968 \\ =1291 \\ =1614 \\ =1937 \end{matrix}\right\}$ $x =$ $\left\{\begin{matrix} 734600725 \\ 5904225418 \\ 19957671181 \\ 47345735232 \\ 92511214789 \\ 159908907070 \end{matrix}\right\}$

The required Values in whole Numbers.

(15) Quest. 200. Answered by Mr. *Charles Wildbore*, the Proposer.

Produce CD to I, and BD to G; and from B as a Center, with the Radius BD, describe the Arc *fe*; Then the Momentary Celerities of the Point D, in the Directions AD and DC, being to each other as the Cosine of AD*f*, to the Cosine CD*e*; the Fluxions of the Lines AD and DC, will be truly represented by these Cosines divided by some constant Quantity *d*. Consequently the Fluxion of $\overline{AD}^{\pm n}$ will be $\pm n \times \overline{AD}^{\pm n-1} \times \frac{\text{Cos. } ADf}{d}$; and that of $\overline{DC}^{\pm n}$ will be $\pm n \times \overline{DC}^{\pm n-1} \times \frac{\text{Cos } CDe}{d}$; but when the Sum of these Powers is a Minimum, their Fluxions must be equal to each other; or, $\overline{AD}^{\pm n-1} \times$ s. $ADG = \overline{DC}^{\pm n-1} \times$ s. BDI, and in the same manner it will appear, that $\overline{BD}^{\pm n-1} \times$ s. $ADG = \overline{CD}^{\pm n-1} \times$ s. ADI; and, $\overline{AD}^{\pm n-1} \times$ s. $ADI = \overline{BD}^{\pm n-1} \times$ s. BDI; and consequently $\frac{\text{s. ADI}}{\overline{BD}^{\pm n-1}} = \frac{\text{s. BDI}}{\overline{AD}^{\pm n-1}} = \frac{\text{s. ADG}}{\overline{DC}^{\pm n-1}}$ which holds universally.



COROLLARIES.

1. If $n = 1$, then will the three Angles about the Point D be = each other.

2. If $n = 2$, then the three Triangles about the Point D are equal to each other, and this Point will be the Center of Gravity of the Triangle.

3. If $n = -2$, then will s. $ADI \times BD^3 =$ s. $BDI \times AD^3 =$ s. $ADG \times DC^3$. Which answers Question 93, in *Martin's* Magazine.

Errata in the last Year's *Diary*; by Mr. *Thomas Moss*.

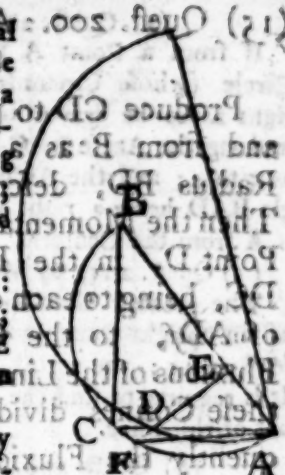
In his own *Solution* to *Quest.* 177, p. 23, l. 7. instead of *mF*, read *m*G. L. 8, for *m*R read *mr*. In the Demonstration l. 13, read *mr* $(= mP) = mr \times \frac{Gm}{GF}$ ∴ QG × QE & $\frac{Gm}{GF}$. L. 17, read Qc = QG. L. 19, read (∴ *Mm* : *mR* :: IQ (QN) : QK. Line the last in the Demonstration, dele s.

REMARK. Mr. *Moss* observes that his Solution to Quest. 177, tho' strictly true, is not so elegant as he could wish to have seen inserted; but as it was the first that occurred to him; and as it is a Rule with us, to receive Solutions along with the Questions proposed; he had not then Time to consider it in any other Light than that which first presented itself; he therefore has favoured us this Year with the following

Con-

CONSTRUCTION.

Upon A, as a Center, with an Interval equal to the Side of a Square, expreſſing the Magnitude of the given Rectangle, deſcribe an Arch of a Circle, cutting the Periphery of the leſſer Semi-circle in F; draw FE perpendicular to AB cutting the Periphery of the greater, in the Point D; thro' which and the Point C, draw the required Line ADC.



DEMONSTRATION.

By ſimilar Triangles, it will be as AB : AC :: AD : AE, therefore AB × AE = AC × AD; but, by the Property of the Circle, AB × AE = AF², = the given Rectangle, by Conſtruction. Q. E. I.

We once more return Thanks to our worthy and ingenious Contributors, for the generous Aſſiſtance and Encouragement they give us in this Undertaking; deſiring (as before) that they will pleaſe to ſend us *Things* entirely new (we receiving every Year many very ſevere Cenſures and Accuſations of Piracy among our Contributors, ſhall not chooſe to publiſh much more of that Sort; but rather keep it from the Publick; except when it ſhall become abſolutely neceſſary: it being (we preſume) very poſſible for two Men to think of the ſame Thing, either at the ſame, or at different Times; and therefore may propoſe a Queſtion which they verily believe to be realy new and their own; when perhaps, upon Publication, the ſame may be found in ſome Author which the Propoſer had never the Opportunity to ſee or conſult) and alſo, that their Schemes may be drawn as perfect as poſſible, and of a proper Size; as well as bring out all Equations in Numbers, in order to facilitate the Labour of the Author's, collecting and compiling the Work; and further (as ſeveral Letters come too late in every Year to be poſſibly inſerted, or even mentioned in the Catalogue) hope they will for the future take Care that they be ſent ſoon enough to come to hand before the firſt Day of *May* in every Year, directed for the Authors of the *Gentleman's Diary*, to be left with *Tho. Peat*, Schoolmaſter, in *Nottingham*. (Poſt paid.) *Nottingham*, 16 *June*, 1759.

New MATHEMATICAL QUESTIONS propoſed to be anſwered in the next Year's DIARY.

(1) Queſt. 201, by Mr. *Abra. Stone*, Land Surveyor.

The Area of a certain Hoſceles triangular Field is Eight Acres and an half: Quere the Sides and Angles; when the Area of the inſcribed Circle is equal Half the Field?

(2) Queſt. 202, by Maſter *William Hutchinſon*, at Mr. *Allen*'s School, in *Spalding*.

Through a given Point, betwixt two right Lines making a given Angle, to draw another right Line, ſo that the Sum of the Parts intercepted by it, and the Angular Point, ſhall be a *Minimum*.

(3) Queſt. 203, by Mr. *Tim. Drury*, of *Great-Houghton*, *Yorkſhire*.

At a certain School where there are 171 Boys, to be taught Latin, Writing, and Accompts ſeparately, at Four Shillings, Six Shillings, and Nine Shillings *per* Quarter; and the Maſter being deſirous to have as much leiſure Time as poſſible, deſires to know how many Boys he muſt teach of each Claſs, ſo as to do the leaſt Work, for the moſt Money, ſuppoſing his Labour proportionable to his Prices?

(4) Queſt.

(4) Queſt. 204, by Mr. *William Kingſon*, of *Bath*.

If from a Point A in the Diameter of a Circle (whoſe Circumference is 69,1152) right Lines be drawn to the Circumference, making the Angle BAC to the Angle CAD as 5 to 4; and the Arch BC = CD, the Angle BAD being a right one: What Diſtance is A from the Center?

(5) Queſt. 205, by Mr. *Tho. Crabtree*.

The greateſt ſlant Height of the Top Slice of an upright Cone is given = 50; and the leaſt = 45; the vertex Angle being 25° 00. It is required to find the Solidity of the greateſt Spheroid that can be cut out of this Slice.

(6) Queſt. 206, by Mr. *Tho. Barker*, of *Weſthall*, *Suffolk*.

Given the Ratio of the Abſciſs, and Ordinate of a Parabolic-Conoid, as 4 to 24, and its Convex Superficies = 6980,58996; Quere the Conoids Dimenſions by an Equation not exceeding a Quadratick of the loweſt Order.

(7) Queſt. 207, by Mr. *John Hudſon*, of *Louth*, *Lincolnſhire*.

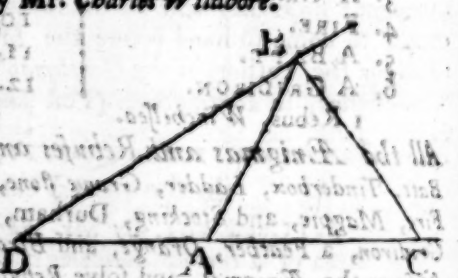
Suppoſe an hollow Globe of Copper, whoſe concave Axis = 2 Feet, was tied by a String (whoſe ſpecifick Gravity is equal to that of Water) to a Globe of Cork whoſe Axis = 1½ Feet; and when thrown into common Water, it was obſerved that ⅔ of the Cork was immerged therein: From hence it is required to find the Thickneſs of the Metal?

(8) Queſt. 208, by Mr. *Thomas Barker*.

Given in a plain Triangle, the Difference of the Segments of the Baſe = 8, and the Sum of the Sides = 150. Quere the Dimenſions when the Area is a *Maximum*.

(9) Queſt. 209, by Mr. *Charles Wildbore*.

Given DC = 100; and the Angle D = 25°. It is propoſed to determine the Point B, ſo that BA being equal to DA; the Sum of BA and BC may be a *Minimum*.



(10) Queſt. 210, by *Tabularius*.

Through four given Points, to deſcribe the greateſt Rectangle poſſible.

(11) Queſt. 211, by Mr. *William Bevil*.

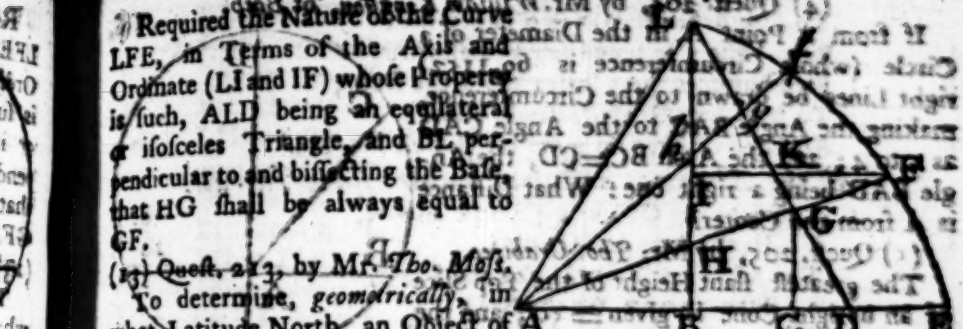
A *Weſt India* Merchant put his Caſh out at 5 *per Cent. per annum* compound Intereſt as followeth; that is 2 Pounds the firſt Week, the Square of that the ſecond Week; the Cube the third, &c. in a geometrical Progreſſion whoſe Ratio is 2. And at the End of thoſe Weeks, he calls in again; the firſt Week one Pound, the ſecond Week two Pounds, the third three, &c. in an arithmetical Progreſſion whoſe common Difference is 1. It is required when there will be 9000 Pounds out at Intereſt?

Mr. *Bevil* remarks thus: "I believe I am the firſt Perſon that propoſed theſe Kind of Queſtions; however, I never ſaw one in Print, before that of mine in the *Gentleman's Magazine* for *Feb.* 1752, and not yet anſwered. The 10th Queſtion in the *Ld. Diary* 1756 is mine, it was *ſtole* from me by one of my *Scholars*, but not by the Perſon whoſe Name it bears, &c.

(12) Queſt.

(12) Queſt. 212, by Mr. *Zach. Gaſtrell.*

Required the Nature of the Curve LFE, in Terms of the Axis and Ordinate (LI and IF) whoſe Property is ſuch, ALD being an equilateral or iſoſceles Triangle, and BL perpendicular to and biſſecting the Baſe, that HG ſhall be always equal to GF.



(13) Queſt. 213, by Mr. *Tho. Moſs.*

To determine, *geometrically*, in what Latitude North, an Object of 16 Feet long muſt be erected pendicular to the Plane of the Horizon; ſo that on the 5 Day of *November* 1760, the tranſverſe Diameter of the Curve, deſcribed on the Plane of the Horizon, by the Top of the ſaid Object, may be 28 Feet.

(14) Queſt. 214, by *Tabularius.*

Given the Length of an inclined Plane BC=60 Feet, and its Altitude AB=30: And ſuppoſe a heavy Body deſcends, by the Force of its own Gravity, from B to C, in the ſame Time that another Body moves uniformly along the Horizontal Plane from C to A; it is propoſed to determine their neareſt Approach to each other.

(15) Queſt. 215, by Mr. *Charles Wildbore.*

The Altitude of a Parabolic Conoid being given=30, and the Diameter of its Baſe=30: It is propoſed to determine the neareſt Diſtance upon the Surface of the Solid, between two Points in the Circumference of the Baſe that are diametrically oppoſite.

Answers to the Ænigmas in laſt Year's Diary.

1. A Tinder Box.
2. A Bird Cage.
3. A Grave-stone.
4. Fire.
5. A Batt.
6. A Gridiron.
1 Rebus, *Winchelſea.*
7. A Stocking.
8. A Feather.
9. An Orange.
10. A Magpie.
11. A Ladder.
12. An Oak Tree.
2 Rebus, *Durham.*

All the Ænigmas and Rebuſes anſwered by Mr. Tho. Vaughan.

Batt, Tinderbox, Ladder, Grave-ſtone, and *Oak Tree*; 5. 1. 11. 3. 12.
Fire, Magpie, and *Stocking*, Durham, Winchelſea: 4. 10. 7. 2 R. 1 R.
Gridiron, a *Feather, Orange,* and *Bird Cage,* do 6. 8. 9. 2.
Anſwer the *Ænigmas*, and ſolve *Rebuſes* true.

All the Ænigmas anſwered by Mr. John Atkinſon.

En Procus alter adeſt, et nova nupta Cloe! Qua.

When *Collin*, Pride of *Sylvia's* Eyes,
Was cruel *Fate's* untimely Prize;
Oak Ladder rais'd're *Phœbus* fled, 12. 11.
Fair *Sylvia* mourn'd, her Fav'rite dead!
Whilſt Batts around the Graveſtones flew, 5. 3.
And *Cynthia* ſlumber'd o'er the Dew:
As Tinder black her Mantlings tore, 1.
Her Stockings dark as Midnight Hour; 7.
No more her Orange Treſſes play'd, 9.
Nor Feather'd Creſt ambitious ſtray'd. 8.
The tuneful Woodlands in the Cage, 2.
No more than Pyes her Grief aſſuage; 10.

(15) Where

Where mournful *Biers* rais'd the Dead,
To *Death* her BROILING Fancy fled.
But, Who e'er found fair Females true?
Five Summer Suns scarce dry'd the Dew;
To heal her Grief *Philander* came;
And *Sylvia* sighs no more for *Collin*'s FLAME! 4.

All the Ænigmas answered by Mr. Isaac Tarratt.

1. Let *Fops* the ORANGE-CLOCK admire,
PIERIDES her CAGE:
The *Maid* her TINDERBOX and FIRE,
HIC JACET for the Sage. 3.
2. The unfledg'd BATT, at *Sly Bo-peep*
In sultry Eve behold;
By Day in sacred OAK may sleep,
As *Druids* did of old. 12.
3. Tell Cook to BROIL some Cutlets fine; 6.
We'll toast Diarian *Peat*;
And Favourites of the *sacred Nine*;
A LADDER for the Cheat. 11.

All the Ænigmas answered by Mr. W. Swift.

As young *Strephon* attempted to give *Cælia* a Kiss,
The MAGPIE she prattles, Take Care pretty Miss! 10.
But, as blind as a BATT when She flies in the Day,
So *Miss* never minded a Word she did say:
But *snugg* by the FIRE with her *Strephon* She sits, 4.
With *Stakes* on the GRIDIRON, and *Birds* on the *Spitts*: 6.
But, *Pol* in the CAGE soon learnt their *Love Song*, 2.
Your STOCKINGS! dear *Miss*, She crys all the Day long: 7.
Then *Cælia* She chides her, Fye *Poll*, I shall have,
More Lyes told about me, than TOMBS o'er a Grave: 3.
Then, an ORANGE She gave her; and bade her be still, 9.
And mind her own FEATHERS, and speak no more *ill*. 8.
Bright as *Spark* in the TINDERBOX *Strephon* he crys, 1.
From the LADDER and OAK, let us learn to be wise: 11, 12.
So ne'er mind, my dear *Cælia*, what of us is said,
The *Parson*'s the *Doctor*, and I'll wed my dear Maid.

All the Ænigmas answered by Mr. Jo. Morce; addressed to Urban.

Fortunatus et ille Deus, qui novit agrestes. VIR.

Permit my PEN in rustic Terms to tell, 8.
What Happiness does in the Country dwell.
Free from the BROILS * which do the Town annoy, 6.
I Feasts of Bliss perpetually enjoy. * A *Gridiron.*
Friend, here, nor any Fops, nor empty Beaux
Appear, with powder'd Wigg, nor colour'd Hose: 7.
Nor here are Balls, nor Play, nor Masquerade,
Such cloying Joys are empty as the Shade!
Here Fields of Pleasure open to the Eye,
Which, far the Courts of greatest Kings outvye
No fierce Ambition here nor Anger reigns,
But blest Simplicity adorns these Plains:
Sweet is the Rest which peaceful *Cambria* yields,
While FIRE and Sword lay Waste *Germania*'s Fields! 4.
E'er blushing *Sol* rise from the Eastern Main,
When serenaded by the warbling Train;

The

The tuneful *Thrush*, the *Lark*, and chattering *Pyes*; 10.
Whose Strains confus'dly pleasant fill the Sky:
I raise my LADDER, and with Transport view
The ORANGE Groves o'erspread with silver Dew; 9.
But when th' advancing Rays of *Sol* aspire,
I Homeward to my CAGE-like Cell retire; 2.
And *Horace* there, or *Homer's* Works peruse,
Soft *Ovid's* Amours, or the *Mantuan* Muse.
But forth again, when BATTS in th' Evening play } 5.
When *Phœbe's* Light succeeds the setting Day, }
Where murm'ring Rivers steer their winding Way; }
On whose delicious Banks the stately OAK, 12.
Or shady *Lime*, in Order grow, I walk.
Despise not, *Urban*, this my humble State,
Who envy not the Grandeur of the Great;
Thrice *Nestor's* Years, if spent in Town 'midst Strife,
Can't MATCH the Joys of one short Country Life, 1.
A Life of Innocence can even brave,
The Frowns of *Fortune*, and outlive the GRAVE! 3.

All the Ænigmas answered by Mr. William Bamfield.

'Twas at the Time when *Goblins* leave the TOMB, 3. *Gravestone.*
And silent BATTS about the OAKS do roam: 5. 12.
'Twas in that Midnight Hour when Silence reign'd,
That *John* to *Susan* went, and love-sick feign'd:
Gentle Compassion warm'd her glowing Breast,
Yet with Admittance he could not be blest;
For this chaste Fair (to keep her Virtue pure)
Was like a MAGPYE, CAG'D up quite secure: 10. 2.
Under the Window, long he prais'd her Charms;
And fondly wish'd t' enfold her in his Arms!
At Length, the yielding Maid, with Love grown kind
Gave free Consent; could he a Method find:
Elate with this! He soon found out the Art
With *Rope* and LADDER: Thus he play'd his Part! 11.
There, Then! no doubt; Nature did dictate well:
And Joys were found, which they themselves may tell!
Then, ere bright *Phœbus* from his Bed arose, }
They both resolv'd to join in *Hymen's* Noose; }
Susan, in bridal Dress, put on her finest HOSE. 7.
The TINDER's friendly Aid they now require, 1.
Which soon communicated willing FIRE; 4.
Some little Dainty of the FEATHER'D Race, 8.
On useful GRIDIRON dress'd in little Space: 6.
All this being done; each fill'd with mutual Bliss,
They seal'd the Bargain with endearing Kiss;
Till, with glad Steps, they pass'd the ORANGE Groves, 9.
To let the *Priest* confirm their happy Loves.

Messrs. *Barker*, *Beer*, *Gosse*, *Harris*, *Hartley*, *Horsfall*, *Hipreates*, *Marsh*, *Rowe*, *Sadler*, *Wescott*, *Wildbore*, and others, sent Solutions to the *Ænigmas* in Verse, which Room will not permit us to publish.

To the Authors. *Gents.*

Tho' *Rebuses*, *Ænigmas*, &c. are by no means the Favourites of modern Delicacy, common Justice, I think, ought to be allowed them.

If they fix the Attention, beget an Habit of thinking, exercise the Fancy, enlarge the Comprehension, and are capable of the Poetical Ornaments of true Wit and Humour; I would venture (were a Tree to be

known by its Fruit) to pronounce them something better than elaborate Trifles; and hereby send you my second Essay of this Kind.

Yours, &c. *W. Bickerstaffe.*

New ÆNIGMAS to be answered next Year.

(1) ÆNigma 147, by Mr. *W. Bickerstaffe.*

Of mental birth, from Heav'n I came,
A Prince of antient worth and Fame;
My god-like Virtues I impart,
My Empire sways the human Heart:
And yet, in modern Times, 'tis said,
My Pow'rs are cold, inert or dead;
That where my Talents I display
Ill Motives oft my Cause betray.

(2) ÆNigma 148, by Mr. *John Thorpe.*

Alike in *Size*, in *Shape*, in *Fashion*;
Subject to neither *Pride* nor *Passion*;
Yet wear a *Furr*, with modish Grace,
But never seen in *Silks* or *Lace*;
Our Business is to please the Fair
And *them* we make our chiefest Care;
Wait *their* Commands, and give Attendance,
Tho' oft on *us* is their Dependance:
To *dirty* Business *chiefly* put,
And trudge from Town to Town on Foot,
Always to please use our Endeavour,
Which, one would think shou'd merit Favour;
But, hard's the Case, for Service past
Abus'd, and trampl'd on at last!

In various Modes and Hues I'm set,
In thought or outward Act compleat.
Tho' cherish'd by the good and great,
A *Spittle's* not below my State;
I build, I bake, I cloathe, I plant,
For present and for future Want:
Yet oft my Gifts how ill requited!
Oppos'd, misrepresented, slighted.

Oppress'd in Age as well as Youth,
Yet, in return, to speak the Truth;
The fair Ingrate we sometimes *nick*
By serving her some saucy Trick.
"As blooming *Jenny* th' other Day
From milking Homeward took her Way,
Tripping along with merry Cheer,
I, and my Brother being near,
He chanc'd to give a sudden Start,
Frighted poor *Jenny* to the Heart!
Down fell the *Pail!* *Jane* got a Tumble
And, surely, She had cause to grumble:
Tho' *great* the Fright, and great the Fall;
I, no Assistance lent at all."

(3) ÆNigma 149, by Mr. *Zach. Gaskell.*

Of worthless Joys abstruse, for grand Parade,
Let Others introduce in Masquerade:
A Worth, in Theme tho' plain, we here prefer,
As tough and hardy as a bold *Hussar*.

If *Use*, the Touchstone of intrinsick Worth
Respect Demands; tho' humble be the Birth;
Then surely I may justly claim a Share
Of Man,——the tender Object of my Care;
A Care you'll say all other Cares exceed,
When you are told, I am a *Friend in Need!*
Yet this my Character; tho' such my Use,
If not confin'd to Duty, often *loose*.

When sultry *Phœbus* climbs the cloudless Sky,
And darts on Man and Beast his burning Eye;
Then am I seldom seen, then seldom roam,
Like *Frogs* and *Snails*, I then abide at Home:
But when the *Welkin* frowns, and *Winds* arise,
Clouds cover Clouds and blacken all the Skies,
Insensible of Ill, or Cold, or Pain,
I *rush* abroad, and face the threat'ning Rain.

My Bulk (take next) is large, so styled *great*,
Now in *dilated*, then *contracted* State;
And when expanded, such my Guard 'gainst Harms,
I clasp my other Brethren in my Arms;
Their Number few, but of unequal Size,
I screen them all; for I the whole comprize;

The

The careful *clucking Hen* so shields from Wrong,
From ravenous *Kites*, or chilling Blasts her *Young*.
By the same Hands our graceful Form we gain.
(Those Hands that many *Camibals* have slain)
And Wounds, deem'd never to be heal'd again.
The sever'd Parts condemn'd in Shades to dwell
By the same Hands *insatiate* thrown to *Hell*:
Hold! Stop! enough is said my Name to tell.

(4) Ænigma 150, by Mr. *Jo. Morce*.

Artists, if e'er Compassion touch'd your Breast
With soft Concern, for Innocence distress'd;
Me you will find (tho' Pity's no Relief)
A suff'ring Object that demands your Grief!
Driv'n from the Earth where Mortals safe reside,
In Airy Realms I ever must abide;
Naked, expos'd to *Sol's* hot scorching Rays
I pass the tedious Length of Summer's Days:
Nor dire Extremes of Heat I only know
But th' intense Cold of Winter's Frost and Snow,
When nodding Forests with the Tempests bend,
And raging Storms the waving Poplars rend;
When angry *Jove's* tremendous Thunders fly,
And rapid Light'nings tear the vaulted Sky!
No Shelter for my guiltless Head I find,
(*Prometheus* like, on *Caucasus* detain'd)
The boist'rous Servants of *Æolus* Train
Do all conspire to aggravate my Pain!
When ratt'ling *Boreas* from the North doth rise,
When piercing *Eurus* thro' the Country flies,
Or gloomy *Notus* with his wat'ry Train,
Ascends with Neptune's Forces from the Main;
On *Me* they war; with *me* they *all* engage;
Me they assault, on *me* exhaust their Rage!
No Coward yet nor Miscreant am I,
I brave their Fury, and their Force defy;
With open Front, I face th' advancing Foe,
The Field I quit not; nor my Ground forego.

(5) Ænigma 151, by Mr. *Thomas Sadler*.

Quite back to our *first* Parents you may trace
My Rise and Pedigree in human Race:
Tho' oft a *Fiend* to *Men*——What can be worse?
Whilst *here* on Earth, I am his heaviest Curse!
Some jolly *Sons* of *Bacchus* know that I,
Their greatest Foe am;——their worst Enemy:
The *Bully*, or the bold Pot valiant *Rake*
I make to run, to tremble, and to quake,
An ancient *Sage*, as History doth tell,
To Anger mov'd,——said, sure I came from Hell!
Oft, with vocif'rous Fury, Storm and Rage;
It's past Man's Art, my Passion to assuage:
I (or my Emblem) oft appear in view
At *Drury-Lane*, and *Convent-Garden* too:
In *Town* and *Country*, I for ever dwell
At *Norbury* too?——What wou'd you have me tell?
As *Juvenal* says, the lab'ring Moon can ease,
And help her from an *Eclipse*, if I please.

Shou'd

Shou'd I within the Peasant's Cottage dwell,
No Joys stay there; ——until my last Farewell:
But, when my *Exit's* made; then *Pleasures* round,
And *Mirth* and *Jollity* go briskly round:
The *happy Pair*, I seldom come a-near;
Where *Virtue* reigns, I never scarce appear.

(6) Ænigma 152, by Mr. *R. Reuffon.*

Say what ye will, ye Men of Merit,
I once *Hibernia* did inherit,
A Piece of Land, tho' not so great
As *Teagues* have boasted on of late
To be their *Ancestors* Estate.
A little Spot contented me,
Till kinder Fortune set me free;
Then courage took, to *England* came,
There cut and slash'd, I purchas'd Fame:
Since, at a Feast, or dainty Mess
I, and my Breed are welcome Guests:
I feed the Poor, I please the Great,
At Table am their constant Mate:
I' th' *Field* I make a gallant Shew
Turn'd up with green, as fine as beau,
And top-knot wear as white as snow.
'Tis true; I cannot bear the cold,
A Fire best suits me when I'm old;
When warm, I am the most admir'd,
My Name is all that's now requir'd.

(7) Ænigma 153, by Mr. *Thomas Harris.*

I hope to your fam'd DIARY no Disgrace,
Tho' in it yet, I ne'er cou'd find a Place:
In Days of yore, I have much honour'd been.
For my Humanity, and Heavenly Mien.
I once saluted *Car'as* rural Strain,
Yet he my touring Voyage ne'er could gain;
Progressive Ages search'd my Paths to find,
And watch'd elaborate, ——but still was blind;
Till *Albion's* Son, with Vigilance arose,
Who trac'd my Paths, and then did me expose.
None can my potent Energy withstand
When boundless Oceans are at my Command:
My beaut'ous Robes are lent me by a Brother,
And I as freely lend them to another;
Who, in return for such Civility,
Full fifteen Times does lib'rally repay.
Ancient and modern Bards *vary* my Name:
Which now to tell may your Attention claim.

(8) Ænigma 154, by Mr. *Charles Wildbore.*

The fear of youth; the dread of age,
Now *bughear* like I mount the stage;
With bleared Eyes, thin meagre jaws;
Long, horny, dirt-enclosing claws:
With hacking teeth, and feeble knees
Hands tremb'ling like the *Aspin trees*:
Each shaking limb salute it's brother
Like *nick-knacks* beating one another:
Old, hungry, comfortless and poor,
Far from each hospitable Door:
Decrepid, naked, full of Woes;
Mid Frost-encrusted lasting Snows.
I make the Soldier draw his Sword;
For me, the Miser heaps his hoard;
Yet as his sordid Bags encrease,
'Tis I that keep his mind from peace:
'Tis I to labour wake the Poor,
And tease the rich in circ'ling store.
Since I first taught to plow and sow,
To me, men smiling Plenty owe:
They owe likewise their Children, Wives
(The pain or pleasure of their lives)
Houses, and lands; yea cloaths, and trade;
And all whereby they're happy made,
Yet, from me *all* would gladly fly
When they're most certain I draw nigh:
For, I proclaim the rich man poor;
Make lovers sigh and lions roar:
'Tis I instruct the lab'ring *Bee*,
And teach the *Ant* her Industry:
And tho' men in all stations show me, [me.
Who finds content, will never know

(9) Ænigma 155, by Mr. *Thomas Vaughan.*

Ænigmatists, give ear to what I say,
Adam and I, had Being the same Day:
For many Ages I was scarcely known,
Little regarded, and esteem'd by none.
But, in Process of Time was made a Knight,
Became the People's Darling and Delight.
No Duke, no Earl, no Lord, nor Knight you'll see,
So much respected and belov'd as Me:
T' enhance my Worth.——I was a Favourite
To *England's* Queen ELIZABETH the Great.
In Me is found a Sov'reign Pow'r to save
Numbers of Creatures from the threat'ning Grave;
But take this Hint; those I serve best of all
Will seldom rest until they see me fall!

(10) Ænigma 156, by Mr. *John Atkinson.*

From infant Years, to hoary Age you'll find,
My tempting Train desir'd by all Mankind:
Without my Aid, no prating *Lawyers* charm,
Nor can the *Parson*, or the *Patriot* warm.
When *Grecian* Heroes stain'd the *Trojan* Stream;
I, in sweet Numbers sung the *Victor's* Fame:
My Charms have blossom'd in *Bucolic* Strain,
And found Acceptance with your Fav'rite *Bun.*
I visit *Will's*, and *Garrick's* House applaud,
Yet rarely grace a paultry *Birth-Day Ode.*
Some honour me, by me their Fortunes raise;
Some call me Spendthrift, and my Use dispraise;
Some simple Youths abuse my Favours shewn,
Turn *Sots* and *vicious* by my gen'rous Boon.
You scratch your Pates, or *beat* your senseless Brain
To make *Ænigmas*; or their Parts explain.

(11) Ænigma 157, by Mr. *William Swift.*

I think I did never in DIARY appear,
Your Attention pray give, if my Name you'd declare,
Know, Legs I have got, but the Truth I must tell,
Yet, I seldom do walk, that is known very well:
As great a *Back-biter* as any's in *France*,
Notwithstanding all that, with the *Ladies* I dance,
And I often presume to steal a sweet Kiss
Which may startle her Lover, as well as dear Miss:
Sometimes to the *Fair* I give Patches or Paint,
Or to dear Master *Fribble*; and oft on the Saint:
But when e'er I am caught, I may well sob and sigh;
Am straightly nail'd down, and immediately die.

(12) Ænigma 158, by Mr. *T. Beer.*

In *Ænigmatic* Verse my Muse indites,
Attention begs, and thus the following writes:
In Labour I, such is my State, alas!
While Mortals sleep, the tedious Hours do pass.
Support the Rich; to th' Poor Refreshment give:
Nourish th' infirm, and Travellers relieve.
I unresisting deign to undergo,
Most dire Diseases, and malignant Woe:
Oh Lot severe! depress'd with poignant Pain
And foul'st Malignity; I ne'er complain.

A Friend

A Friend I am to Sailor, Soldier, Chief:
To th' weary *Hind*, and *Peasant* give Relief:
I drooping Spirits raise; Alacrity create;
Man, when possess'd of me, lays by Debate.
With Ladies I, in private may be seen,
To their Embraces oft receiv'd I've been:
Ye learned Tribe, from hence my Name explore;
The Mists dispel, I ask from you no more.

(13) Ænigma 159, by Mr. *John Clark*.

I from an ancient King my Being claim,
Yet was before him, and am still the same:
Tho' oft with Wretches mean, I take my Station
Am, for my Honour valu'd thro' the Nation:
I to the Ladies am a well known Friend,
And where they go, I mostly do attend;
But, yet alas! if I should chance to fall
So sure I bring Confusion on them all!
Once I was lost,——suppose on *English* Ground,
'Till *Fortune* brought my *Sire* where I was found:
Old *Antiquaries* say, if they tell right
I was the Signal to begin the Fight.

A Quere by Mr. *John Atkinson*.

Si fugio, sequitur, sed me fugit usque sequentem:
Res mira et vera est, dic mihi, quæso, quid est.

An *Alphabetical* Catalogue of Contributors to this *Diary*: Wherein the Figures 1, 2, 3, &c. shew the Questions, and the Numericals, i, ii, iii, &c. the Ænigmas each Contributor answered, &c.

Astronomus 9. 11. Mr. J. Atkinson, all Æ. but xi. & both R. in V. prop, i. Æ. and a Quere in *Latin*. Mr. W. Bamfield 5. all Æ. and both R. in V. Mr. Tho. Barker 1. 2. 4. 6. 7. all Æ. & Reb. in V. prop. 6. 8. Mr. Tho. Barnett 1. 2. 7. Mr. Edw. Barrass, most Æ. & Reb. in V. Mr. Tho. Beer, *ditto*. Mr. W. Bevil 5. 6. 9. 12. prop. 11. Mr. W. Bickerstaff prop. 1. Mr. Turner Boston 1. 2. 10. 13. i. iv, v, vi, vii. ix. xii. & both R. & prop. 1. Reb. Mr. W. Chapman iv, v, vi, vii, viii, ix. xi. & both Reb. Mr. John Clark, prop. 1 Qu. 1 Reb. Mr. Tho. Coram 1. 5. 7. all Æ. but x. Mr. Tho. Crabtree 1. 2. 7. 8. all Æ prop. 5. Mr. Tim. Drury 1. 2. 12. prop. 1. Mr. W. Eaton 1, 2. 5. 7. 13. Mr. Luke Elstob i. iv. vi, vii, viii, ix. & both Reb. Calc. Ecl. Mr. Tho. Ford ii. iv. vi, vii, viii, ix. xii. Fretum v, vi, vii. ix. xii. & both Reb. Mr. W. Foster 1, 2. i, ii. v, vi, vii, viii, ix. xi, xii. & both Reb. Mr. Zachary Gaskel prop. 1. Q. i. Æ. Mr. Tryphena Gosse all Æ. in V. prop. 1. Æ. Mr. John Goodhead all Q. but 14, 15. all Æ. Mr. Geo. Guthrie 1, 2. prop. 1 Q. Mr. Jos. Harrington 1, 2, 12 all Æ. but 8, & both R. Mr. Tho. Harris 2, 3. 5, 6. 12. all Æ. & both R. in V. Calc. Ecl. prop. 2 Qu. & ii. Æ. Mr. St. Hartley all Qu. but 14, 15. all Æ. & both R. in V. prop. i Æ. M. W. Holmes vii. Mr. J. Holroyd 1. 2. 4, 5. 9, 12. Mr. Abr. Horsfall all Æ. & both Reb. in V. prop. i Æ. 1. R. Mr. John Hudson 3, 4, 5, 6. 8, 9 12. all Æ. but 3. prop. 1 Qu. Mr. W. Hutchinson 6. 9. all Æ. Hypocrates all Æ. and both R. in V. Mr. W. Kingston all Qu. but 14, 15. all Æ. but i. both Reb. prop. 1 Qu. Mr. Robt. Marsh all Æ. & both Reb. in V. Mr. Walter Matthewson ditto. Mr. Ch. Mesban 1. 4. 7. ii, iii. v, vi, vii, viii, ix, x. xii. and 2 Reb. Mr. John Metcalfe 1, 2, 3, 4. 6. 12. Calc. Ecl. Mr. F. F. Mingle all Æ. but 7. both Reb. Mr. Jos. Morce most in V. prop. 1. Æ. &c. &c. &c.

FINIS.